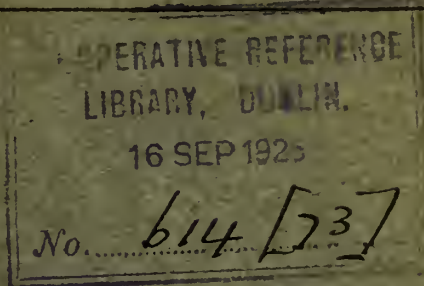


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# The Public Health Movement

## THE ANNALS

OF THE

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OF

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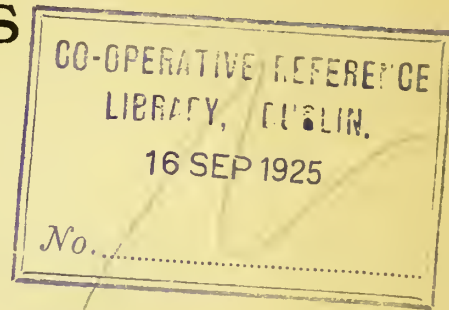
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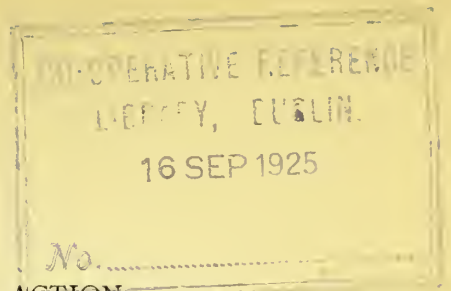
PART ONE

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*The General Problem*







## HEALTH NEEDS AND CIVIC ACTION

By WILLIAM H. ALLEN, PH.D.,  
Director Bureau of Municipal Research, New York City.

Of \$112,000,000 requested last year in 4400 appeals to one New York philanthropist, \$1,075,000 was asked for various co-operative health purposes. Of this total, only \$45,000, or less than one-half of one per cent., was asked for preventive or educational health work. The rest was for hospitals, dispensaries, clinics, etc.

Of \$163,000,000 in public benefactions last year, \$19,100,000 was for health purposes. Of this not one dollar was for teaching laymen or governmental officials how to use knowledge already possessed, while \$6,800,000 was for finding facts not yet known about cancer, hookworm, etc., and \$12,200,000 for hospitals and medical colleges.

When John S. Kennedy's will provided for public benefactions of \$32,000,000, not one dollar was given in a way that indicated an interest in preventive health work, or in what we speak of as the "health movement." The only part of his gift of which he could have been certain that any fraction would be applied to preventive and educational health measures was the \$750,000 for the New York School of Philanthropy, where in the treatment of social and civic subjects, considerations of private and public health are given emphasis.

Among the world-famous gifts of Mr. Rockefeller and Mr. Carnegie, which together total nearly \$350,000,000, not one dollar has been given specifically for furthering the administrative use of health knowledge already possessed, whether by experts or by the public, and less than \$10,000,000 is known to have been given for hospitals and medical research.

What does it mean to the "health movement" that, while hospitals received last year in wills and in large gifts over \$10,000,000, the National Committee of One Hundred could not raise \$10,000 to show the need for a National Bureau of Health?

Is it not really true, as might seem from the figures, that rich

men and women prefer to spend their money on curing a handful rather than on protecting a townful, or on training a few medical students rather than on training a nation? Is a *not-yet-found* germ of disease more alluring to a philanthropist than a *not-yet-found method of getting communities to kill the infinitely more important and more famous germs already understood, and to apply for all of us the laws already known to the favored few?* No. They give from misinformation, not from choice.

The gap between what we know and what we get done—between obvious opportunities for large giving and the actual large giving for health purposes—is one helpful index to the present status of the “health movement” in the United States. It is not true, as one is apt to imagine when reading a list of health activities—of beginnings such as are described in this volume—that a nation has been won over to a full appreciation of its health problems. True, subjects that were considered impossible for use in the magazines and newspapers ten years ago are given prominent places with profuse illustrations. True, as the physician has lost his monopoly on knowledge of health laws, the layman has found health stories and health work absorbing. True, our bill-boards, street cars, magazines and newspapers, afford innumerable evidences that huge factories have been built and stores started to cater to the new appreciation of health laws—*e. g.*, vacuum cleaners, incinerators, sanitary drinking fountains, sanitary underwear, ventilated shoe-soles, disinfectants, “spotless town” soaps, health cereals, etc. Yet we are barely beginning, and cannot go much farther without giving new direction to two forms of private benefaction: (1) money gifts by rich men and women; and (2) thought gifts by those who most influence private giving and public spending.

If private giving had none but positive influence, we could afford to disregard it, for its volume is small when compared with health work done through taxes. But private giving has also negative, obstructive, deflecting, inhibiting influences on those who read of it. In fact, its *thought and feeling product* is vastly more significant than its *cure or relief product*. For example, when John D. Rockefeller said to the world, “There will never be money enough to do the world’s uplift work,” he started in motion forces and doubts and compromises that will do vastly

more harm to the South than the hookworm. On the other hand, by a statement in his autobiography that there is money and to spare to do the world's uplift work, the world's most intelligent giver on a large scale would have done more good than millions for health or medical education. Therefore, it behooves us who are enthusiastic over the immeasurable strides recently made by the "health movement" to consider the direction of our thinking about *the work that remains to be done*.

Let us take up some of the alternatives confronting rich men and women, and the still richer communities of taxpayers who are confronted with the same facts as are rich men and women, to illustrate some of the misconceptions now current.

The medical examination and inspection of school children has "arrived." Newspapers and magazines have given miles of space to describing the benefits to school children from having their physical defects discovered and from being constantly protected against the spread of transmissible diseases. Taking one hundred readers of THE ANNALS at random, probably ninety of them will be under the impression that certainly the greater number of twenty million school children are now enjoying the benefits of these advanced methods so widely heralded. The actual condition, so far as state laws are concerned, is that medical protection to school children is provided for in but ten States. Even in New York State itself at the present writing the educational and health officials are under the impression that this is not a good year to introduce a bill providing for physical examination of all children in all schools. The only place in the country where children in private and parochial schools, as well as in public schools, are by law assured the benefit of medical inspection and examination is in the city of Indianapolis. It is true that in almost all of the larger cities there is now a nominal effort to discover physical defects. It is also true, unfortunately, that with few exceptions, the discovery of the physical defects goes no farther than the statistical records of the board of education or the board of health.

In New York City, which, because of the large figures necessary to describe its experience, is responsible for the greater part of the publicity on this subject, the city superintendent reports that for the last school year but a little more than one-third

of those in the schools were examined at all, and of 264,425 defects found, only 113,278 were remedied. To get this total of defects remedied, the health inspectors advise tooth brushes *as treatment* for defective teeth.

Except as money and time are spent in getting done what now everybody knows ought to be done for all children in all schools—laws compelling examination, school nurses for examination, school physicians for diagnosis, house-to-house instruction of parents, harnessing hospitals, philanthropists and health departments to preventive and educational work, establishment of clinics, constant comparison of work attempted with work done, hygiene instruction and hygiene practice at school, which will stop manufacturing defects at their source and give the children right habits—it will be generations before the majority of our children will have these health rights which most of us now take for granted they possess. The money which will build one hospital in Chicago would get all schools in the country under this legitimate load.

The story of the "dental awakening" affords another illustration of the need for constant challenge of our expenditures for health. Men have been pouring millions upon millions into hospitals. It is now admitted that many of these millions have been worse than wasted, because dental knowledge has not been applied within hospital and dispensary walls. So much more is now being done by dentists than was done five years ago to enlist the layman's co-operation and to emphasize the dentist's social mission, that even among dentists themselves the impression is gaining currency that the world is aroused to the need for dental care. Many a city, however, has had the experience of New York: (1) Physical examination of school children without proper examination of the teeth; (2) Piling up records of defective teeth with almost negligible facilities for securing treatment; (3) Permitting children's teeth to be extracted when they should be repaired and cleaned; (4) Heralding one or two dental clinics as evidence that dental needs have been recognized; (5) Promise of wholesale co-operation between dentists and public schools with practically no examinations or treatments of children. The \$2,000,000 given for dental clinics and instruction in dentistry in Boston could be so used as to



give a nation clean teeth and habits that will preserve clean teeth. Would it be worth while?

The crusade against infant mortality has finally come down to the simple proposition of what the mother knows and does for her baby. The only agency in any community equipped to do 100 per cent. of the educational work that is required to equip mothers to save their own babies is the city or state government. Those most interested in saving babies have the choice of spending time and money in getting done 100 per cent. of the educational work for 100 per cent. of the mothers who need it, or diverting public attention and private funds to the maintenance of a few nurses or a few milk stations, or, worse still, a few babies' hospitals. When confronted with this choice in Hoboken, Mrs. Robert L. Stevens established a memorial to her husband which shall be used "to increase, year after year, the number of mothers and fathers who will take an interest in Hoboken's city government, so that schools shall be progressively better, streets cleaner, recreation more enjoyable, and health rates and civic ideals progressively higher."

What promises to be the most conclusive demonstration in infant care ever made in this country is that shortly to begin in New York City, where fifteen milk stations will be maintained by the department of health and supplemented by district nurses in all needy sections. Attempt to picture 100 per cent. of the problem has been made by the New York Milk Committee, which is now asking for \$300,000 for enough milk stations so that this coming summer no baby and no mother will be without the direct and constant educational influence of those who know that there was absolutely no excuse last summer for losing 3293 babies, under one year of age, just "because the weather was hot."

The campaign for a National Bureau of Health and for the Children's Bureau discloses elements which we must keep constantly in mind in any health program. They emphasize particularly the need for funds ample to permit those who conduct any educational campaign to keep everlastingly at it. The Committee of One Hundred not only has never had the money which its opportunities justified and required, but it has never dared to ask for money enough to meet, for example, the miseducating campaign of the quack medicines and quack medical men who

fear a strong health policy at Washington. When we stop talking of public benefactions, as if each were an intelligent gift and could possibly do no harm, it is inconceivable that again, as in the past, when this national health policy needed public support, nearly \$300,000,000 will be given away for public purposes by the very private citizens who refuse to help a nation-wide crusade for individual and public health.

The National Children's Bureau adds its testimony and, in my judgment, its warning to those who are investing energy or money in promoting health campaigns. It would have been just as easy to interest Theodore Roosevelt in the possibilities of the United States Bureau of Education, United States Bureau of Census, and a United States Bureau of Health, as in a special not-yet-existing Children's Bureau. The same energy that tried to arouse a country to the need for an additional agency, with an income of \$30,000 or \$40,000 a year, could have organized and galvanized these other already existing agencies, in touch with a half-million teachers, fifty state and colonial superintendents of education, fifty state and colonial departments of health, all the city bureaus of vital statistics, etc. We social workers can hardly hope to divert the millions upon millions of private philanthropy that now pour into curative institutions over into preventive work, if we ourselves fail to see that our greatest problem, like our greatest opportunity, is in making existing agencies efficient, and in getting done what we all know ought to be done in ways that we know it should be done.

It is one of the anomalies of present-day reform, and even present-day health work, that we undervalue the potential service of the newspaper, except when we want to make appeals for our own work. The Healthgrams of Chicago's health officer, Dr. William A. Evans, could, if generally known and generally imitated, do more for nation-wide promotion of health than a thousand hospitals. Why will we go on believing it is worth while for private philanthropists to work in a few spots a part of the time, while permitting newspapers, street railways or billboards to advertise, all of the time to all of the people, various nostrums which aggravate disease and manufacture misconceptions on which disease thrive? In two New York Sunday papers one issue printed 27 columns of advertising more potent for evil than

27 cases of smallpox equally flagrant. Have you ever compared the amount spent in your city by private philanthropy to fight tuberculosis with the amount spent by quacks to advertise quack medicines for these same tuberculous neighbors?

Take, for instance, the campaign against infant mortality. It would be an interesting study to note on what days of last year the newspapers of your city printed facts about saving babies. Were these newspaper items and editorials addressed to the mothers who have the babies, or to the men and women who have the money to support private work? Did they relate to 100 per cent. of the babies, or to one per cent. or to 10 per cent. cared for in different private institutions? Was the maximum attention given in the summertime when babies could be saved, or in wintertime when the annual reports of child-saving institutions were published? In New York City, at the height of the infant mortality of last summer, toward the end of June and early in July, day after day, hundreds of thousands of citizens, including practically all mothers of young babies, read shouting headlines to the effect that there was no hope for reducing infant deaths because the hot wave would last another week. Private agencies, instead of coming "square back" to the mothers through these same welcome sources of information, utilized the torrid wave to state their own need for funds. The health department itself finally accepted the co-operation of the newspapers, and day after day told the New York public that babies died because the milk was warm or unclean, and not because the weather was hot or baby was hot.

In my judgment, we cannot go much farther in our health crusades without more funds for making such effective use of the newspapers as has characterized the crusades for legislation against the white plague and child labor.

Propaganda for more laws or more hospitals makes news more easily than propaganda for the enforcement of laws already obtained, and the effective use of hospitals and health agencies already established. Here energy and money must be spent in getting facts about the non-enforcement of child labor and other laws, and the administrative remedies for the non-enforcement of our child labor, factory, truancy, compulsory education laws, etc.

Just as we are never going to have dentists enough to do the repair work for a nation with unclean teeth, so we are never

going to have private agencies enough to undo the evils of inefficient administration by public officials and employes who are working for good or evil every day in the year with the momentum of 100 per cent. of their communities. Clean streets are more deadly enemies to tuberculosis than are hospitals and dispensaries. Efficient state and local departments of health can do more to check transmissible diseases than state and local private organizations. Getting 100 per cent. of us "under the load" by placing our official representatives under that load, with methods that do efficient routine work, is a duty imposed upon all of us by the growing interest in health laws. As Superintendent Young illustrated by opening Chicago's school windows, it is infinitely more important to give 100 per cent. of our school children proper ventilation than to start open-air classes for the anæmic and tuberculous.

The only time in the year when our communities attempt to picture 100 per cent. of their health opportunity and health needs is when they are preparing their local or state budgets. The only document that pretends to outline 100 per cent. of a community's health needs is the budget estimate. The only document that pretends to describe 100 per cent. of what a community proposes to do next year for promotion of health is the city budget. Yet to a degree that is astounding, when one considers public responsiveness to the "health movement," budget estimates, budget hearings, budget making and budget possibilities are still unknown lands to health crusaders.

Still more of a stranger is interest in the after-budget fulfillment of before-budget pledges. From one end of the country to the other are illustrations in almost every city, that getting money voted for a health purpose is by no means the same thing as getting money used for that health purpose.

In October, 1909, at a taxpayers' hearing on the budget for the year 1910, the need for a comprehensive fight against tuberculosis was presented with a skill and with authority such as were probably never before equalled in any public hearing in any American city. All the money was voted that such famous experts in the fight against tuberculosis as Robert W. DeForest, Abraham Jacobi, Simon Flexner, Woods Hutchinson, etc., declared was needed. Public schools, Bellevue and allied hospitals,



and the health department, received all the money asked for the tuberculosis campaign. Yet with two months' full notice that the money would be available January 1, 1910, not one of these agencies was ready on January 1st to begin to spend the money as planned, and not one of these agencies had spent the money as planned by December 31, 1910. The health department allowed \$4727 in January, \$2590 in February and \$9875 by July 31st to lapse for want of organization and direction. Instead of twenty out-door school rooms, the board of education equipped but three and used but two. (Those wishing information on budget making and budget estimates, budget hearing and after-budget records and accounts that will disclose the truth about after-budget uses of appropriations, are referred to the Herman A. Metz National Fund for Promoting Efficient Municipal Accounting and Reporting, 261 Broadway, New York.)

\* Utilization of health knowledge already known requires attention now more than the discovery of facts heretofore concealed. With almost negligible exceptions, we can stamp out diseases common to man without knowing one more fact regarding medicine. The great problem of the next few years is to show medical men themselves and philanthropists who like to give money for training medical men and medical research that the supreme need is for administrative use of medical knowledge already in hand.

An investigation by the Carnegie Foundation for the Advancement of Teaching has given the physician's halo and that of the medical college a pretty severe tilt. Hundreds of thousands of readers, who, until that report, felt that medical schools were distributors of health knowledge, were made to see that what the country needs even more than physicians are men and women who can teach to what a very great extent physicians are unnecessary. For example, after working for a couple of years, the Rockefeller Fund seems to have proved conclusively that the cure for the hookworm requires chiefly the application of a few elementary principles of cleanliness. The great problem in the South seems to be, not to find germs, analyze them and discover means for killing them, but to give the Southern farmer and small town modern standards of cleanliness and modern local and state machinery for applying modern sanitary methods everywhere.



Likewise the union of Columbia University and the Presbyterian Hospital for the bedside training of medical men raises a question whether an additional step must not soon be taken to supplement bedside instruction with sewer-side instruction, unclean milkshop-side instruction, unclean home-side instruction, uninformed mothers-side instruction, unlighted tenement-side instruction, unventilated factory-side instruction, etc.

It is not true that a cause is always advanced when everybody comes to see the necessity for promoting it, and when everybody talks about it. Oftentimes consciousness of social need acts like a drug, putting the public to sleep instead of opening its eyes, unless supplemented by administrative acts which harness public conscience and public intelligence to efficient daily routine work.

Immediately after hearing of the Slocum disaster—the burning of several hundred women and children on an excursion boat on the Hudson River—I telephoned to Sea Breeze to ask about our fire protection for several hundred mothers and children on fresh-air outings, and for forty children suffering from bone tuberculosis. Fire drills were started at once, and upon my first visit I asked to see one. The promptness, efficiency, pleasure and order that characterized that fire drill were a joy. There was just one defect—nobody had been detailed to turn on the water. Had there actually been a fire, it is not inconceivable that buildings would have been entirely empty or several lives lost before discovering it was nobody's business to turn on the water.

This is the condition of a great number of our health crusades at the present time. The public is convinced, everybody knows that water puts out fire, everybody knows that there must be organization, but in too many instances, even when we have our fire drill organized, we have not yet arranged for turning on the water and keeping it on until the fire is out.

Social workers and the philanthropists and officials they try to influence can pay biggest dividends these next few years by seeing and taking the administrative steps necessary to utilize, every day in the year, the knowledge they already possess *through the only agencies which belong to all of us, which make mistakes or advance steps in the name of all of us,—our city, county, state and national governments.*

## HOUSING AND HEALTH

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By LAWRENCE VEILLER,  
Secretary, National Housing Association, New York.

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Dirt and disease have gone hand in hand too long. As modern surgery owes its rapid strides to the discovery of asepsis and the banishment of dirt from the operating room, so modern medicine is about to come into its own through the banishment of dirt from our communal life. The slum, the mother of disease, is now doomed. Its end is in sight. From ocean to ocean, throughout the land, there is a newly awakened consciousness of our past folly and a slowly dawning perception of our inherent right to decent conditions of living.

We have paid dear for our slums, and have given hostages to fortune, leaving a heavy debt for posterity to liquidate. No one has even attempted to estimate the cost to the nation of our bad housing conditions, because it is an impossible task. Who can say of the vast army of the unemployed, how large a portion of the industrially inefficient are so because of lowered physical vitality caused by disadvantageous living conditions? To what extent is the forbidding atmosphere of so many homes an element in the problem of inebriety? Of the burdens which the State is called upon to bear in the support of almshouses for the dependent, hospitals for the sick, asylums for the insane, prisons and reformatories for the criminal, what portion can fairly be attributed to adverse early environment?

Despite our vaunted civilization, our material prosperity, our increasing love and appreciation of things artistic, our greatly improved architecture, our musical development, our mastery of the mechanical world, our readiness of invention, our diffusion of education, our higher standards of liberty, in a word, our greatly increased culture, we are still in some respects "barbarous America." From the past no word comes to us of the slums of ancient Tyre or Sardis or of noble Athens—only a faint breath from decadent Rome, to tell us that the worst they had did not approach the evils of present-day America.

In the great majority of our cities we are still in that rudimentary state of sanitary knowledge where we know no better than to surround ourselves with the vilest elements of human waste, which we allow to remain near the homes of the poor for long periods of time, turning living places which should be gardens of delight and centers of sweet repose into nothing more nor less than disease factories, whose daily output is literally disease and death. We still suffer to remain in large numbers even in the crowded quarters of our cities, where the poor are huddled close together, and where disease spreads quickly, thousands of vile privies, vaults, sinks, cesspools, outdoor closets, "sanitary conveniences," so-called. No one knows how many thousands of these there are, but the city where they are not present in large numbers is exceptional. Even New York, with its four and three-quarter millions of people, had 7000 of them up to a few years ago. Baltimore still has 70,000 earth closets, and through all her existence has had no system of public sewers, but only now is installing one. St. Louis can still show 12,000 privy vaults, Philadelphia and Chicago have literally hundreds of thousands of outdoor closets, and many privies and cesspools. Indianapolis, Milwaukee, Pittsburg, Cleveland, Cincinnati, Nashville, Birmingham—all have to admit the presence of these ancient evils by the thousands. The list might be added to indefinitely. Hardly a city in America is free from this blight.

That such conditions could prevail among the cultured, well-to-do, progressive people of America to such degree is unthinkable. That people of intelligence and wealth would continue to live in such surroundings is not to be believed. And, of course, they do not. These conditions are to be found only among the homes of the poor—in our slums, in those foreign colonies which we have allowed to spring up in the various sections of our cities, "empires within an empire," segregated from American institutions, isolated communities feeling but slightly the touch of democracy—"social Saharas," as they have been aptly called.

Just because these evils have been removed from our immediate sight we have foolishly fancied ourselves secure, and have believed that they do not touch us. But the "mighty miasmatic breath blown from the slums" penetrates all parts of the town. No home is

exempt, no person secure. Disease, no respecter of persons, visits all alike.

The sordidness of it all, the degrading baseness of it, unfortunately is withheld from the eyes of most of us. What it means to the people who have to live in the midst of it we can but faintly conceive. Let us frankly admit that these conditions result in imposing upon the great mass of our working people habits of life that are more compatible with the life of animals than with that of human beings. What it must mean in its effect on the standards of decency, of modesty, of morality even, of young girls growing into womanhood, I leave to the reader's imagination.

The effect upon health is direct and intimate. To the debilitating influence of the noisome odors in the hot summer weather may be traced much of the illness of the poor; to such influences are largely traceable their lowered vitality and inability to readily resist disease. The connection is even more direct; myriads of flies swarm throughout the hot months, feed on the contents of the vaults, and then proceed to infect the food supply of the people in the neighboring stores, in the kitchens where food is preparing—and with their dangerous burden crawl upon the faces and bodies of the sleeping infants in the homes of the poor. Nor do they stop there—even the homes of the rich are not exempt from the dangers of the typhoid fly.

That conditions such as these should grow up in a young community like America, without our becoming conscious of them, is not strange, but the time is rapidly passing when we can longer plead ignorance and extreme youth as excuses for our failure to act.

Few cities have as yet dealt effectively with this situation, but, fortunately, the number which have awakened to the significance of these conditions is constantly increasing.

We are rapidly passing out of the stage where the representative men of a community with whispers discuss these evils and in subdued tones deprecate their ventilation on the ground that it is "bad for business" and will "hurt the city's fair fame." Far-seeing men realize that any such ostrich-like policy but postpones the evil day, that the continued tolerance of the conditions in the long run injures the city and that a low death rate and a

well-earned reputation as "a city of homes" is one of the best assets a city can have. Such men realize that frank, open-minded discussion of health needs is a prerequisite to their cure. Diagnosis must precede treatment. In many cities groups of business men, chambers of commerce, etc., are themselves actively taking hold of these problems. They are abandoning the policy of concealment and working that there may be nothing to conceal.

Strangely enough, democracy itself seems to be an obstacle to sanitary progress. It is a disconcerting and startling discovery to make, but the evidence is unmistakable. In those cities where the "workingman owns his own home," where there are miles and miles of small one-story and two-story houses, the sanitary authorities will tell you that they have the greatest difficulty in meeting health needs, in securing adequate appropriations, in enforcing higher standards. A low tax rate becomes in such communities a fetich of sinister effect. Where the community is made up to a predominant degree of working people, many of whom "own" their own homes by the payment of but \$25 or \$50, as is frequently the case, the tax rate becomes directly felt to a degree that cannot be appreciated in other communities where the burden of high taxes is more widely distributed and is frequently disguised in the form of rent and increased prices of commodities.

In such cities every public expenditure is viewed with the closest scrutiny—public officials, who owe their office to popular vote, are loath to pursue any course of action that will impose upon the electorate at large additional expense. Bond issues for needed public improvements, for installing a system of public sewers, for example, or for alley improvement, are often voted only with great difficulty.

The small property owner, with limited resources, staggering frequently under burdens which he should never have placed on his own shoulders, lured by "land hunger," and sometimes by the hunger to be a landlord, is the greatest obstacle to progress. Burdened as he is, limited in his intelligence, his own standard of living low, his knowledge of sanitary science practically *nil*, it is not strange that he should not place the welfare of the community above that of self-interest, and should not divorce in his



consideration of public questions, their effect on his own pocket from their value to his neighbors and to posterity.

The low standards of living of such a man are further obstacles to sanitary advance. Living himself under sordid surroundings, content with the conditions that he has known from early childhood, he can see no reason for the new "fads and fancies" which the health authorities would compel him to provide for his tenants. If vaults are good enough for him, they are quite good enough for his tenants, whom he considers as social and industrial inferiors.

The false cry for "economy" which now is so popular, and which is usually a cry for false economy, threatens to wreck our institutions. Its appeal to the taxpayer is immediate and satisfactory. His materialistic sense is gratified, and he cares little if it means a serious setback to the sanitary and social progress of the community. It will take the country years to recover from its present hysterical outbreak in this direction.

It will be a long time, I fear, before we return to a sane realization that with our advancing standards of civilization, the increased burdens imposed by unrestricted immigration, and our constantly enlarging conceptions of governmental functions, expenses of government must necessarily increase from year to year. New sources of revenue must be developed, due economy should be practiced, waste eliminated so far as practicable, but retrenchment in public expenditures should never be made at the expense of the health of the community.

It is due largely to the conditions just described that we have as yet in no city dealt effectively with our alley problem. The alley is both a blessing and a curse. As a means of letting light and air into the interior of city blocks that would otherwise be without it, it is a distinct gain. And the few cities that have no alleys feel their misfortune in this regard most keenly. The small, pocketed back yards, shut away from the free current of air, are unknown in the city with alleys. The alley is generally however, an evil. As a minor street, hidden away at the rear of everything, it becomes the dumping ground for all the cast-off material of humanity. Here will be found collected, in all stages of picturesque disorder and sordid squalor, all of the unpleasant things of our material existence.

The privies generally are close to it. Piles of manure, those pest factories which breed uncontrolled the typhoid fly by myriads, frequently overflow into it. Uncollected garbage, in the hot summer months, lies there in decaying heaps. Surface water, slops, wash-tub emptyings, leakage from privies and from stables cover the surface with slime. Old paper, tin cans, rubbish and refuse of every kind are everywhere; huge rats, living and dead, add to the general horror.

In many cases, these are the playgrounds of the children of the working people. In some they are the only approach to their homes, the sole outlook upon life they get from the windows of their dwelling places. And we wonder at the improvidence of the poor, at their inebriety, at their shiftlessness! We are surprised at the burdens which the State has to bear in the support of the defective and delinquent.

Unpaved, as most alleys are, the cleaning often is a difficult problem. This difficulty is greatly enhanced by the fact that in most cities the city itself assumes no responsibility for their cleanliness, but looks to the abutting property owner to perform this function. The result is what might be expected. We years ago passed beyond that stage of our development where we imposed on private citizens the responsibility for cleaning the streets in front of their houses, but we still, in many cities, foolishly expect them to clean the streets in the rear. In few cities are the alleys policed or lighted at night. They become often, therefore, the haunt of criminals, and naturally lend themselves to practices which shun the light.

All of these evil conditions are well recognized in most of our cities, but the same causes that have tended to perpetuate the evils of the privy vault have been operative here as well. The small property owner, to whose wishes the elected public official is sensitive, objects to assessments for paving the alleys. He sees no "benefit," in the financial sense, to his property, and he is unwilling, as a rule, to be asked to pay for an improvement which, from his point of view, does not "improve," and which he thinks too good for the class of people from whom he draws his revenues.

The alley, if it is to remain, must be treated as a street. It must be paved; it must be cleaned at regular intervals, that is,

kept clean, not made clean; it must be lighted and it must be policed. Before any of these things can be done the city must officially assume responsibility for it; where it does not already own the fee, the owners must dedicate it to the city.

The cry for "economy" and the desire to keep down the tax rate operate against the carrying out of these measures. If the alleys are to be cleaned by the city as often as the streets are cleaned, the cost of street cleaning will increase at least fifty per cent. So, if they are lighted and policed, the city's yearly expense will be similarly increased.

But it is a false economy that stands in the way of carrying out these greatly needed reforms. It is saving at the spigot and wasting at the bung-hole. We are paying the cost now, in fact, but in indirect and less obvious ways. It will cost the city more for police, but less for police courts and jails; more for street cleaning, but less for hospitals and relief. It is better economy to keep people well than to get them well, to prevent crime than to punish it. The cost must be paid one way or another. If we refuse to pay it in treasure now, we must pay it in both blood and treasure in the end.

The filth and squalor which surround the homes of the poor in so many of our cities may be traced to similar causes. From the very nature of things, the working people cannot be expected to hire carts and cart away the refuse which accumulates. Nor is there much likelihood of the average landlord doing this under the conditions of our ordinary urban existence.

This is a function of the municipality, and, if the city neglects it, the responsibility must be placed where it belongs, upon the city officials who are so benighted that they do not see the short-sightedness of their policy, and upon the citizens who are so penurious that they prefer to tolerate the evil conditions rather than increase the cost of government. There are few cities in America to-day where the garbage is collected with sufficient frequency or regularity. And the city which collects rubbish, ashes and other waste is as yet the exception rather than the rule.

Tuberculosis, that sinister terror of former years, is thought by many to be about to vanish from us, but sober vision indicates that it will be many years before we see it disappear. Although it would seem that no one could have escaped learning the im-

perative necessity of fresh air and sunlight, yet, notwithstanding that we have been taught that tuberculosis is a "house disease," that in dark, unventilated rooms it thrives and flourishes, and that the germs cannot live in strong sunlight, yet in how few cities is the speculative builder restrained from adding new dark rooms to swell the present number. In growing Western cities, where space is plentiful and land is cheap, new tenement houses are built with half the rooms dark—it is easier to do it that way. And, as a nation, we normally choose the easiest way. In no city, East or West, have we so far progressed as to prohibit in our private dwellings and our public buildings rooms without direct outside light and air. Everywhere, irrespective of land values, one encounters an intense, individualistic desire to cover over an undue amount of the lot, and occupy, if possible, every foot of land.

In our houses on wheels, the railroad cars and trolleys, where disease spreads most easily and rapidly, we have just begun to enforce standards of ventilation; one might almost say we have hardly commenced it. In our public buildings we are still in the dark ages; our court houses, our municipal and state buildings, our schools and churches, our workshops, our theaters and the moving picture shows, where so many hundreds of thousands of people congregate nightly, proper ventilation is the exception rather than the rule.

We have a long and difficult campaign of education ahead of us before we can approach reasonable health standards in this regard. Most people do not want fresh air in their homes or elsewhere. It is not only "night air" that is dreaded, but all fresh air. Let a man open a window in a railroad train, or trolley car, or even at a convention of physicians or sanitarians, and see what happens. How quickly some one closes it who cannot stand "the draft." All the ignorance in this regard cannot be charged to the "great unwashed."

Viewing these conditions, it seems premature, at least, to talk of establishing "garden cities" and "zone systems." These highly desirable ideals, so successfully carried out in the Old World, must wait until we can bring ourselves to attend to the elementary principles of sanitation and the rudimentary principles of community living. It is as if the doctor attending a

patient desperately ill with typhoid or pneumonia were to concern himself before the crisis of the disease had passed with the patient's diet during the convalescent stage. We have not yet reached the convalescent stage, but are still battling for the patient's life.

Underlying all of the evils we have thus far discussed is our failure, as a nation, to develop sanitary inspection as a vital adjunct of municipal administration. We lead the world in the development of the science of sanitary plumbing, in our ready adaptation of new mechanisms and devices, the products of our inventive genius, but sanitary inspection here is still in its infancy.

In most cities it is still unexplored territory. With two exceptions, New York and Chicago, no city in America has as yet developed a system of inspection that is worthy of the name of system. And even in these two cities only a beginning has been made.

In the majority of cases we are still employing methods that belong to the pre-glacial period of sanitary science. In practically all our health departments we sit down now, as we did years ago, and placidly await "citizens' complaints" of unsanitary conditions, assuming that, when we have attended to these we have done all that need be done. Perhaps, when we were a homogeneous nation of American citizens, it was safe to trust to this method, but that period has long passed. With our foreign "colonies" in every city, with the mass of our working population made up, more and more, of the peasantry of Europe, ignorant of our language and customs, unused to our standards of living, and unable to make articulate their dissatisfaction with the conditions under which they are compelled to live, we can no longer look to any such methods of discovering and remedying sanitary evils.

Many of the poor in our large cities do not know that there is such a thing as a board of health; of those who do know of its existence, few know where to find its offices, or, if aware, cannot afford the time to travel to them to call attention to evil conditions, and the great mass is too illiterate to send written complaints. Back of it all, too, is the certain knowledge, gained from bitter past experience, that if the source of the complaint



is discovered, eviction by the landlord is sure to follow. So, the worst conditions remain undiscovered, for weeks, often for months, sometimes for years, and the poor finally become hardened to them, believing them unescapable and inherent in poverty itself.

This system, too, has interesting "by-products" which the student of social and municipal affairs should not overlook. It makes for unfair discrimination. It seems to indicate to the landlord whose property is frequently complained against that he is singled out, "persecuted," as he puts it, when he sees worse conditions in neighboring property tolerated and left alone. Nothing can convince him that it is not due to political "pull" on the part of his neighbor that he is able to escape attention. He is prone to charge graft, politics and crookedness to the administration, and thus there is bred in the public mind that distrust of popular government which is rapidly making the holding of public office unattractive.

In place of this casual, haphazard method there must be substituted the only system of sanitary inspection that is worthy of the name. Instead of sitting calmly waiting for complaints, health inspectors must systematically go about "looking for trouble"—they will find plenty. Instead of sending a man to look at one thing in one house, because it is complained about, there should be a well-trained corps of men going over every part of the homes of the poor, systematically and thoroughly, scrutinizing carefully every part of the building where trouble might naturally be expected—all the probable danger points. Such inspection would include the cellar, the water closets and privies, the public halls and stairs, the roof, the out-premises, the individual apartments and the plumbing, with especial emphasis laid on the public parts of the building. It should be done on the health board's initiative, and should be periodic, that is, at sufficiently frequent intervals to ensure the maintenance of the homes of the poor in proper sanitary condition. Once a month is the ideal. Once a year is the minimum. Three times a year should be practicable in most cities.

Coupled with this inspection to discover sanitary evils so that they may be abated, there should go a system of "instructive sanitary inspection" by trained women inspectors. It sounds

paternalistic, but we might as well face the fact that many of the poor must be taught how to live. This is especially true of the inhabitants of our large foreign "colonies." To many of them American standards of living are totally new. They have no conception of the functions of modern plumbing, for instance, and often fail to realize that methods of waste disposal which were satisfactory to them in sparsely settled country districts of rural Europe, and which there brought no evils in their train, may not safely be followed in the more closely built-up sections of our urban communities.

Instruction of this kind must necessarily be undertaken with the mothers and children. In the homes it must be given by women, and women who have the power and authority to follow up their advice with orders, when necessary. Much can be done in the schools. Whatever is done should be done in a practical way, with apt illustration, and through direct personal influence, rather than by distribution of "literature."

It is easy to say, "These things should be done," and they commend themselves at once to most minds. In only two cities in the United States, however, New York and Chicago, is a system of periodic sanitary inspection carried on. And in only one city is any work being done along the lines of "instructive sanitary inspection."

Why, one asks, should American cities be so far behind the enlightened standards of sanitary science? Partly because we have drifted along, choosing the line of least resistance, and partly because we have fallen into a rut in our health work and have only just begun to stand off and look at it and weigh its value.

The failure to progress faster and to reach higher standards is, however, due to far more fundamental causes. We have hitherto not been civilized enough or intelligent enough to be willing to spend money for the preservation of health. In hundreds of cities, still, the health commissioner receives no compensation, or so slight a one that he can afford to give but a small portion of his time to the work.

In every city in the country the health department is terribly undermanned. It cannot begin to attempt to do what it knows to be imperatively necessary for the city's welfare. I can con-

ceive of no more trying situation than that which most of our earnest and conscientious health commissioners encounter year after year, having to sit helplessly by and see their recommendations ignored, and the annual toll for unnecessary disease and death increase year after year. The blame for the evil conditions cannot be laid at the doors of our health officials. With but few exceptions, they have done their part, and if, after years of effort of this kind, they finally lapse into a state of hopeless indifference, they are not to be blamed. Who would not give up hope under such circumstances? The blame must be placed on us all—on the whole community, on our best citizens, and our worst. It is our fault and no one's else that these conditions continue.

We have been so stupid or so careless that we have paid little or no attention to our slums. We have been willing to spend money lavishly to protect property, but not to protect human life and health. Large sums we grant annually in all our cities for the support of the police and fire departments, but we grudgingly apportion mere pittance to our health departments.

In New York  $1\frac{1}{2}$  per cent. of the city's annual expenditures is for health work, as compared with 5 per cent. for fire protection, 9 per cent. for the police, and 17 per cent. for education. And New York leads the country in its health expenditures and has more generous treatment in this regard than any other city in America. And yet, even in New York last year, where its efficient health commissioner certified that the welfare of the city required the expenditure of \$4,076,578 for health work during the coming year, the financial authorities granted him but \$2,823,499.

What are we to think of a city like Chicago, with all its wealth and culture, where the city authorities pay no heed to the statement of the expert head of its health department, that \$1,500,000 is requisite to meet the health needs of the city, and allow him little more than one-third of that amount? And this in the face of a campaign of education, in which the health authorities showed just what the citizens of Chicago could buy with their money in the way of health.

In the face of such statements as the following, coming from

the highest official authority, it is difficult to understand how such a decision could have been reached:

Chicago now has a 21-cent per capita health department. A 21-cent health department for Chicago can hold the gross death rate under 16 per 1000 for a few years. It can hold the number of deaths from diphtheria at about 800; from scarlet fever at about 600; typhoid at about 300, and baby deaths from summer complaint at about 3000. It can keep smallpox epidemics at about twelve years apart, and paralyzing epidemics of diphtheria or scarlet fever about four or six years apart.

A health department spending 50 cents per capita should put diphtheria down to, say, 100 deaths per year; scarlet fever to about 500; typhoid to 120, and cut off 5 per cent. from the consumption mortality. It should be able to add 10 years to the smallpox intervals and 3 or 4 years to the diphtheria and scarlet fever intervals.

The final conclusion is that we can have freedom from preventable diseases in proportion as we are willing to pay for it. We cannot have something for nothing. A 21-cent health department means about 15,000 deaths from preventable disease a year. If we pay more, we will have fewer. If we pay less, we shall have more.

Which shall it be: Dollars or deaths?

In the last analysis, it all resolves itself back to the degree of intelligence and enlightened public sentiment which are to be found in the community.

Still, the outlook for the future is hopeful. We are passing out of the dark ages of sanitary science. Housing and health are receiving each year increased attention, increased thought. We are rapidly ceasing to be "barbarous America."

## SCIENTIFIC RESEARCH BY THE PUBLIC HEALTH SERVICE

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The increasing complexity of modern society gives rise continually to new sanitary problems which must be solved and the results applied if we would escape race deterioration and loss of industrial prosperity. Under present conditions the individual is himself unable to exercise all these measures of protection. Public health administration is therefore necessary, and one of its important functions is scientific research.

Governmental activities in the field of preventive medicine have accordingly included systematic investigations, practically all modern governments having made more or less provision for them, depending on the special problems presented for solution. A comparative statement of such provisions in the several countries and their influence on the public health would be of interest, and in the United States would necessarily include those of the federal, state, and municipal governments. It is practicable here to describe only the activities of the Federal Public Health Service, which service, however, is but a part of the public health organization of the country; the state and municipal health agencies being also included, and all being related by law and by reason of their common object.

While the triple relation mentioned has probably resulted in the past in a distribution of scientific effort and consequently limited centralization, on the whole it has been responsible for an immense amount of work of the greatest importance, and it is a striking fact that in addition to the several public health laboratories of the federal government there is authority in law for laboratories in no less than twenty states.

The present official interpretation put upon the constitution prevents the federal government from exercising police powers with



respect to sanitation within the states themselves. This restriction, consequently, modifies to some extent the character of the investigations by the Federal Public Health Service; but does not limit their scope, which embraces laboratory studies of all matters pertaining to the public health and the dissemination of the information thus acquired.

Organized originally to provide care and treatment for sick and injured sailors of the merchant marine, the Public Health Service has had a steady growth, having from time to time been charged with additional duties and granted greater powers. These additional duties included the prevention of the introduction of contagious and infectious diseases and their spread from one state to another, the medical inspection of arriving aliens, the supervision over the propagation and sale of viruses, serums and toxins, and in connection with all of them there was necessity of scientific investigations.

### *The Hygienic Laboratory*

The activities in the field of scientific research may accordingly be said to have originated when these additional duties were assumed, and to have taken definite shape with the establishment of the hygienic laboratory at the Marine Hospital, New York, in 1887. Their inception therefore was practically coincident with the beginning of the growth of the science of bacteriology, which may be said to mark the start of the present public health movement that has now assumed world-wide proportions. It soon became evident that the foundations of public health research should be laid at the seat of government, and the laboratory was accordingly moved to Washington in 1891.

Since the quarantine act of February 15, 1893, imposed on the service the devising of regulations and their enforcement, for the prevention of the introduction of infectious and contagious diseases, and since the etiology, methods of transmission and prevention of some of those diseases was then but indefinitely understood, there was necessity of special studies of those subjects. In the early nineties, therefore, increasing attention was paid to the developing science of bacteriology and its bearing on preventive medicine. Officers attached to the Hygienic Laboratory were sent

abroad to acquaint them with the methods employed in foreign laboratories and the progress made. By this means, for instance, knowledge was had of the methods of propagating an immunizing serum for use in the treatment and prevention of diphtheria, and as a result diphtheria antitoxin was first made in the United States in the Hygienic Laboratory in November, 1894.

Studies were likewise made of disinfectants to determine their germicidal value and best methods of application, and for the generation of sulphur dioxide, furnaces were devised which, with but slight improvement, are now in use at the national quarantine stations. An autoclave for the evolution of formaldehyde gas was also invented and the best method of using it determined. These and many other practical discoveries indicate that substantial progress was made, and that the Hygienic Laboratory was developing into an important center for research in public health problems.

In the meantime important scientific studies were also being made by officers in the field, particularly in connection with epidemic work; those of Carter on the period of incubation of yellow fever having had a most important bearing on the subsequent investigations of that disease. In fact, his recorded observations on this point were hardly less important than Finlay's hypothesis in laying the foundation for success in the final demonstration of the transmission of yellow fever.

The outbreak of plague in Hongkong in 1894, which proved to be the beginning of the present pandemic of the disease, also stimulated research as to its nature and methods of prevention. There was therefore prepared in the Hygienic Laboratory, at the proper time, large quantities of the prophylactic vaccine for distribution in case the disease should be introduced, and bulletins containing the latest knowledge regarding plague were distributed for the information of public health officials and the public generally. By these means officers of the service became familiar with plague and were thus qualified to undertake quarantine duty at both domestic and foreign ports, and when the disease actually gained a foothold on the Pacific Coast they were prepared to recognize and combat it.

Prior to 1902 the Hygienic Laboratory had been devoted almost entirely to research in pathology and bacteriology, but a lab-

oratory building had been authorized by Congress in March of the preceding year, and it became evident that in order to discharge the functions for which it was created, and which were demanded in the public interest, there should be some enlargement of scope and reorganization on broader lines.

In accordance with an act of Congress of July 1, 1902, reorganizing the service, therefore, there were created three new divisions, which made in all four divisions of the Hygienic Laboratory, designated respectively as: pathology and bacteriology, medical zoology, pharmacology and chemistry. This act also provided for an advisory board of nine members, four of whom are officers of the government, and the remaining five eminent in their respective fields and connected with private educational institutions. By this means the laboratory is brought in touch with like institutions and the surgeon-general can secure advice with respect to the investigations to be made and the methods of making them.

It had long been the practice to make record in the annual reports of the work accomplished, or in the public health reports which have been published weekly since 1885, and in some instances special brochures were issued independent of these publications. But with the reorganization of the service in 1902 it was apparent that the results of investigations, in order to be of the most benefit, should be published as Hygienic Laboratory Bulletins. Since that time seventy-three such bulletins have been issued, their titles being as follows:

Preliminary Note on the Viability of the *Bacillus pestis*.

Formalin Disinfection of Baggage without Apparatus.

Sulphur Dioxid as a Germicidal Agent.

Viability of the *Bacillus pestis*.

An Investigation of Pathogenic Microbe (*B. typhi murium* Danyz) Applied to the Destruction of Rats.

Disinfection against Mosquitoes with Formaldehyde and Sulphur Dioxid.

Laboratory Technique: Ring Test for Indol; Collodium Sacs; Microphotography with Simple Apparatus.

Laboratory Course in Pathology and Bacteriology.

Presence of Tetanus in Commercial Gelatin.

Report upon the Prevalence and Geographic Distribution of Hookworm Disease (Uncinariasis or Anchylostomiasis) in the United States.

An Experimental Investigation of *Trypanosoma lewisi*.

The Bacteriological Impurities of Vaccine Virus; an Experimental Study.

A Statistical Study of the Intestinal Parasites of 500 White Male Patients at the United States Government Hospital for the Insane. A Parasitic Roundworm (*Agamomermis culicis* n.g., n.sp.) in American Mosquitoes (*Culex sollicitans*). The Type Species of the Cestode Genus *Hymenolepis*.

Spotted Fever (Tick Fever) of the Rocky Mountains; a New Disease. Inefficiency of Ferrous Sulphate as an Antiseptic and Germicide.

The Antiseptic and Germicidal Properties of Glycerin.

Illustrated Key to the Trematode Parasites of Man.

An Account of the Tapeworms of the Genus *Hymenolepis* Parasitic in Man, Including Reports of Several New Cases of the Dwarf Tapeworm (*H. nana*) in the United States.

A Method of Inoculating Animals with Precise Amounts.

A Zoological Investigation into the Cause, Transmission and Source of Rocky Mountain "Spotted Fever."

The Immunity Unit for Standardizing Diphtheria Antitoxin (Based on Ehrlich's Normal Serum). Official Standard Prepared under the Act Approved July 1, 1902.

Chloride of Zinc as a Deodorant, Antiseptic, and Germicide.

Changes in the Pharmacopoeia of the United States of America.

The International Code of Zoological Nomenclature as Applied to Medicine.

Illustrated Key to the Cestode Parasites of Man.

On the Stability of the Oxidases and their Conduct toward Various Reagents. The Conduct of Phenolphthalein in the Animal Organism. A Test for Saccharin, and a Simple Method of Distinguishing between Cumarin and Vanillin. The Toxicity of Ozone and Other Oxidizing Agents to Lipase. The Influence of Chemical Constitution on the Lipolytic Hydrolysis of Ethereal Salts.

The Limitations of Formaldehyde Gas as a Disinfectant with Special Reference to Car Sanitation.

A Statistical Study of the Prevalence of Intestinal Worms in Man.

A Study of the Cause of Sudden Death Following the Injection of Horse Serum.

I. Maternal Transmission of Immunity to Diphtheria Toxine. II. Maternal Transmission of Immunity to Diphtheria Toxine and Hypersusceptibility to Horse Serum in the Same Animal.

Variations in the Peroxidase Activity of the Blood in Health and Disease.

A Stomach Lesion in Guinea Pigs Caused by Diphtheria Toxine and Its Bearing upon Experimental Gastric Ulcer.

Studies in Experimental Alcoholism.

I. *Agamoflaria georgiana* n.sp., an Apparently New Roundworm from the Ankle of a Negress. II. The Zoological Characters of the Roundworm Genus *Filaria* Mueller, 1787. III. Three New American Cases of Infection of Man with Horsehair Worms (Species *Pagordius varius*), with Summary of All Cases Reported to Date.

Report of the Origin and Prevalence of Typhoid Fever in the District of Columbia.

Further Studies upon Hypersusceptibility and Immunity.

Index-Catalogue of Medical and Veterinary Zoology. Subjects: Trematoda and Trematode Diseases.

The Influence of Antitoxin upon Post-diphtheritic Paralysis.

The Antiseptic and Germicidal Properties of Solutions of Formaldehyde and their Action upon Toxines.

1. The Occurrence of a Proliferating Cestode Larva (*Sparganum proliferum*) in Man in Florida. 2. A Re-examination of the Type Specimen of *Filaria restiformis*. 3. Observations of Two New Parasitic Trematode Worms: *Homalogaster philippinensis* n.sp., *Agamodistatum nanus*. A Re-examination of the Original Specimen of *Taenia saginata abietina* (Weinland, 1858).

Milk and its Relation to the Public Health.

The Thermal Death Points of Pathogenic Micro-organisms in Milk.

The Standardization of Tetanus Antitoxin (an American Unit Established under Authority of the Act of July 1, 1902).

Report No. 2 on the Origin and Prevalence of Typhoid Fever in the District of Columbia.

Further Studies upon Anaphylaxis.

*Hepatazoon perniciosum* (n.g., n.sp.); a Haemogregarine Pathogenic for White Rats; with a Description of the Sexual Cycle in the Intermediate Host, a Mite.

Studies on Thyroid: I. The Relation of Iodine to the Physiological Activity of Thyroid Preparations.

The Physiological Standardization of Digitalis.

Digest of Comments on the United States Pharmacopoeia. Eighth Decennial Revision for the Period Ending December 31, 1905.

Further Studies upon the Phenomenon of Anaphylaxis.

Chemical Tests for Blood.

Report No. 3 on the Origin and Prevalence of Typhoid Fever in the District of Columbia.

The Influence of Certain Drugs upon the Toxicity of Acetanilide and Antipyrine.

The Fixing Power of Alkaloids on Volatile Acids and its Application to the Estimation of Alkaloids with the Aid of Phenolphthalein or by the Vollhard Method.

Quantitative Pharmacological Studies: Adrenalin and Adrenalin-like Bodies.

Milk and Its Relation to the Public Health.

I. The Presence of Tubercle Bacilli in the Circulating Blood in Clinical and Experimental Tuberculosis. II. The Viability of the Tubercle Bacillus.

Digest of Comments on the Pharmacopoeia of the United States of America (Eighth Decennial Revision) and the National Formulary for the Period Ending December 31, 1906.



The Oxidases and Other Oxygen Catalysts Concerned in Biological Oxidations.

A Study of the Anatomy of *Watsonius* (n.g.) *Watsoni* of Man, and of 19 Allied Species of Mammalian Trematode Worms of the Superfamily *Paramphistomoidea*.

Quantitative Pharmacological Studies: Relative Physiological Activity of Some Commercial Solutions of Epinephrin.

The Taxonomic Value of the Microscopic Structure of the Stigmal Plates in the Tick Genus *Dermacentor*.

Digest of Comments on the Pharmacopoeia of the United States of America (Eighth Decennial Revision) and the National Formulary (Third Edition) for the Calendar Year Ending December 31, 1907.

Studies upon Anaphylaxis with Special Reference to the Antibodies Concerned.

Facts and Problems of Rabies.

I. The Influence of Age and Temperature on the Potency of Diphtheria Antitoxin. II. An Organism (*Pseudomonas protea*) Isolated from Water, Agglutinated by the Serum of Typhoid Fever Patients. III. Some Considerations on Colorimetry, and a New Colorimeter. IV. A Gas Generator, in Four Forms, for Laboratory and Technical Use.

The Solubilities of the Pharmacopoeial Organic Acids and their Salts.

The Bleaching of Flour and the Effect of Nitrites on Certain Medicinal Substances.

The Effect of a Restricted Diet and of Various Diets upon the Resistance of Animals to Certain Poisons.

A Study of Melting Point Determinations with Special Reference to the Melting Point Requirements of the United States Pharmacopoeia.

I. Some Known and Three New Endoparasitic Trematodes from American Fresh Water Fish. II. On Some New Parasitic Trematode Worms of the Genus *Telorchis*. III. A New Species of *Athesmia* from a Monkey.

I. Report of an Outbreak of Typhoid Fever at Omaha, Neb. (1909-1910). II. The Water Supply of Williamson, W. Va., and its Relation to an Epidemic of Typhoid Fever.

The Effects of a Number of Derivatives of Choline and Analogous Compounds on the Blood-Pressure.

These bulletins represent very well the scope and activities of the Hygienic Laboratory in relation to scientific research. But in addition there have been published in the medical and scientific literature, or placed on file in the archives of the bureau, many brief reports and papers that have had a distinct value in the advancement of public health administration.

The Hygienic Laboratory has also been utilized as a school of instruction for officers of the Public Health Service, and its facilities have been extended from time to time to sanitary officers on

request of state health authorities. By this means the sanitary corps has been strengthened, and from among its members have been developed those capable of conducting independent research. By this means also it was possible to inaugurate scientific investigations in connection with public health stations already established.

Severe outbreaks of the great epidemic diseases have been indications for the conduct of research of a clinical or laboratory nature in the infected localities. By this means special studies of smallpox were made on the Mexican frontier in 1895; yellow fever was studied in the Southern States, and plague in Honolulu, T. H.; Seattle, Wash., and San Francisco, Oakland, and Los Angeles, Cal.

#### *The Federal Laboratory of the Pacific*

The suppression of plague in a community is closely associated with the eradication of the disease among rodents. In order, therefore, to determine the extent of the epizootic among these animals daily examinations of large numbers are necessary, and there has also been need of careful studies to clear away the mysteries surrounding the relationship of the disease in man and animals.

The Federal Plague Laboratory was therefore established during the first plague outbreak in San Francisco, and has been an important agent in the suppression of the first and second outbreaks of the disease. Its most lasting value, however, will be derived from the scientific studies conducted therein regarding the epidemiology of plague among ground squirrels and other rodents. Some of the published reports of these studies are as follows:

Plague Infection in Rats.

Organic Diseases of the Rat.

Rodents in Relation to the Transmission of Bubonic Plague.

Rodent Extermination; Rats and Mice.

Rat-Proofing as an Anti plague Measure.

Notes on Rat Leprosy and on the Fate of Human and Rat *Lepra Bacilli* in Flies.

Experimental Investigation of Biting of Man by Fleas from Rats and Squirrels.

Evidence of Plague Infection among Ground Squirrels.

General Observations on the Bionomics of the Rodent and Human Fleas.

As an additional means of disseminating information regarding the pathology and diagnosis of plague in rodents, mounted speci-

mens of plague tissues were prepared and furnished to over one hundred and fifty medical colleges and models illustrating various phases of the disease made and exhibited to the public.

In the Federal Laboratory on the Pacific careful observations have been made not only of plague lesions, but other abnormalities among rodents, particularly lawless growths. The exact value of this work can not yet be estimated, but in view of the stimulus given to the study of cancer by the recent successful transplantation of tumors, it is possible that careful observations of these abnormalities may in time develop additional facts that will have some bearing on the cancer problem. At any rate, it was through such observations that a leprosy-like disease of rats was first detected on the Pacific Coast, which observation is of particular interest to those engaged in the study of leprosy in man.

While the above-mentioned laboratory was established only in response to a great administrative necessity, and therefore limited in its scope, there are cogent reasons why it should be enlarged and devoted to the solution of the sanitary problems peculiar to the Pacific Coast. One of these is the necessity of epidemiological studies of leprosy and certain diseases peculiar to the Orient.

#### *The Leprosy Investigation Station*

A commission was appointed in 1899 in accordance with a provision of an act of Congress to study leprosy, particularly with reference to its prevalence in the United States. These studies developed the fact that there were no less than two hundred and eighteen cases of leprosy located in twenty-one states at the time the report of the commission was made in 1902, and indicated that some provision should be made for the national care of lepers. More important still, it indicated that there should be systematic studies of leprosy with the view to determining the methods of transmission of the disease and the improved methods of treatment.

Congress accordingly provided for such investigations in Hawaii, and appropriated funds for the establishment of a leprosy investigation station on the island of Molokai. Systematic studies were begun in 1906, and the results are recorded in thirteen papers. The titles of these papers are as follows:

The Present Status of the Leprosy Problem in Hawaii.

The Reaction of Lepers to Moro's "Percutaneous" Test.

A Note Upon the Possibility of the Mosquito Acting in the Transmission of Leprosy.

Upon the Utility of the Examination of the Nose and the Nasal Secretions for the Detection of Incipient Cases of Leprosy.

A Report upon the Treatment of Six Cases of Leprosy with Nastine (Deycke).

Leprosy in the United States of America in 1909.

A Statistical Study of an Endemic Focus of Leprosy.

A Palliative Treatment for Leprous Rhinitis.

Mosquitoes in Relation to the Transmission of Leprosy.

Flies in Relation to the Transmission of Leprosy.

Heredity versus Environment in Leprosy.

Notes on the Study of Histories of Lepers from the Standpoint of Transmission.

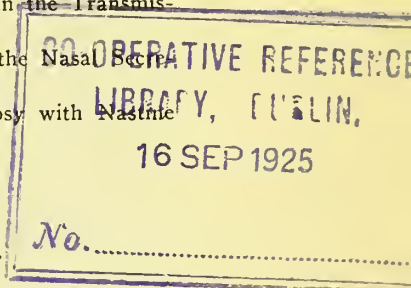
A Contribution to the Study of Rat Leprosy.

Early in the work it was recognized that the solution of the leprosy problem was to be sought for among incipient cases and in the homes of the lepers themselves. A branch laboratory was accordingly established at the Kalihi Station on Oahu, where lepers are brought on being apprehended, and here work of the most important character is being prosecuted. While it is inadvisable to anticipate the results of these studies before publication, it is pertinent to refer to the successful growth of the leprosy bacillus, and the important bearing this achievement will have on the subsequent steps of the investigation. In fact the way is now open for the production of a therapeutic vaccine and perhaps an antitoxic serum.

### *The Laboratories of Marine Hospitals and Quarantine Stations*

Besides the above laboratories devoted wholly to research, provision is made at certain of the marine hospitals and quarantine stations for making public health investigations. At the quarantine stations such studies have mostly to do with determining the best means of disinfection and perfecting methods for their application. In addition, extended experiments have been made of the life history of mosquitoes, the culicidal properties of gases and other subjects specially related to quarantine practice.

At the marine hospitals there is always opportunity for clinical research, and in some instances this is unexcelled because of the character of the patients admitted and the fact that they come from



every quarter of the globe. In addition these stations are utilized as public health stations where certain experiments can be long continued. For instance, at the marine hospital at Wilmington, N. C., investigations are now being made of soil pollution and the best methods for its prevention; a question the solution of which must have an important bearing on the improvement of rural sanitation. Because of their location, and relation to the public health service, these stations are capable of becoming the recognized centers of special research, and with adequate authority to admit for purposes of scientific studies cases of diseases affecting the public health there would be provided a powerful means of determining the causes, methods of transmission and prevention of such diseases within the country.

The field for research is broad, but in view of present limitations as to funds, the investigations to be undertaken must be carefully planned and the work directed in order that there shall not be duplication or loss of energy. It was accordingly recognized that a central office was necessary that would keep in touch with the scientific workers and relieve them of certain administrative obligations. This was accomplished through the establishment of a bureau division of scientific research.

#### *Supervision of Viruses, Serums and Toxins*

With the reorganization of the Marine Hospital Service into a Bureau of Public Health in 1902, a division of scientific research was provided, through which are handled the administrative matters connected with service investigations.

Special work of a statistical character is also carried on and the results published from time to time in the form of Public Health Bulletins.

It is the additional duty of this division to supervise the publication of all scientific reports, except the "Public Health Reports," and to discharge those administrative duties connected with the enforcement of the law of July 1, 1902, regulating the propagation of viruses, serums and toxins in interstate traffic. This law requires that all viruses, serums and toxins offered for sale in interstate traffic shall be propagated and prepared only in establishments licensed by the Secretary of the Treasury. Licenses are granted



only after inspection of establishments made in accordance with regulations issued under the law, and examination in the Hygienic Laboratory of products for which license is desired. Since these biologic products are intended for hypodermatic injections, their freedom from contamination is of paramount importance, and because of the great value of some of them in the treatment of the diseases for which they are intended, it is essential that purity and potency should be assured. The adoption of standards, therefore, became necessary. Standards for testing the strength of diphtheria antitoxin and tetanus antitoxin were especially needed, and investigations to this end were undertaken and continued until a standard for diphtheria antitoxin was adopted in 1905, and a standard for tetanus antitoxin devised in 1906. The standard units are prepared in the Hygienic Laboratory and distributed bi-monthly to all licensed manufacturers and others concerned, and, by means of examinations of serums on the market from time to time, it is determined whether they are free from contamination and conform to these standards, and in the case of those products for which no standard has been devised, whether contamination is present or not. It is evident that the administration of the law regulating the propagation of biologic products involves a large amount of highly technical work and requires investigations in the broad field of immunity. As a result studies of anaphylaxis in relation to immunity have been continued over a period of more than four years and stimulated an immense amount of work on the same problem in other laboratories throughout the world. The number of biologic preparations intended for the prevention and cure of diseases of man is rapidly increasing, and their standardization becomes a matter of importance. Investigations with this end in view therefore comprise one of the most important activities of the service at the present time.

An inquiry into the prevalence of rabies during 1908 and subsequent studies of antirabic virus led to the preparation of that product for administration at the Hygienic Laboratory and its distribution for the use of state health authorities. As a result, this treatment was made available to 1,143 patients from April 25, 1908, to June 30, 1910, and the problems of rabies are being carefully investigated.

*Zoological Investigations*

Beginning with the discovery of the *Uncinaria Americana* in 1902, studies of hookworm disease have been carried on with great energy, and in my opinion no other single event in the field of preventive medicine has had as far-reaching importance to the people of the United States since the discovery of diphtheria antitoxin. The studies already made have not only accounted for a large amount of invalidism in the South and cleared away in some measure the confusion with respect to several diseases, but they have demonstrated the methods necessary to the improvement of the physical and mental vigor of the people of an important section of the country. Zoological studies in the interest of the public health are especially indicated in view of the causal relation of animal parasites to diseases and the influence of insects as carriers of infection, and represent a broad field of activities of the Public Health Service. Studies of a number of subjects are now in progress, and the results of those completed are contained in bulletins already published.

*Pharmacologic Research*

Authority having been granted in 1901 for laboratory investigations of matters pertaining to the public health, and a division of pharmacology in the Hygienic Laboratory having been authorized in 1902, pharmacologic studies became a part of the activities of the service. Investigations of organo-therapeutic and other medicinal preparations were inaugurated and have been continued. Digests of comments on the Pharmacopoeia and the National Formulary are compiled regularly and published for use in connection with revision of those important official standards. The importance of establishing standards of strength for potent drugs has opened up a wide field for investigations; those already in progress relating to epinephrin, ergot and digitalis. In addition, new preparations are being made from time to time and studied as to their therapeutic value. These matters also involve physiologic consideration including the functions of the ductless gland.

Recent announcement of the discovery of an arsenic preparation reputed to have marvelous curative properties in certain protozoal diseases indicates the possibilities of pharmacologic studies,

and emphasizes the importance of their continuance under official auspices.

### *Chemical Studies*

As previously stated, provision was made for a division of chemistry in the Hygienic Laboratory, wherein have been conducted systematic studies of water and milk in relation to the public health. The action of ferments and the chemistry of the blood have also been considered and the results published as bulletins. Other studies made and the bearing of chemical questions on the public health emphasize the scope of this division, which was but recently organized and which is destined to fulfil an important function in public health work.

### *Epidemiological Investigations*

The foregoing organization for research and the facilities for carrying it on have resulted in the co-operation of several of the divisions along epidemiologic lines.

Typhoid fever has been the subject of continuous studies for over four and one-half years, and has engaged the attention at times of three of the divisions of the Hygienic Laboratory. Aside from tuberculosis there is no infectious disease that is more nearly universal in the United States, and none deserving more earnest study from both health and economic standpoints.

Systematic studies into the origin and prevalence of typhoid fever were begun in the District of Columbia in 1906, and carried on there during four seasons. A large amount of accurate data was accumulated and published, throwing light on the local problem and having general application to typhoid fever problems in other sections of the country. Studies of the disease have also been made by the service in five widely separated states; and the facts elicited while clearing up local problems have indicated the necessity of like studies in other sections of the country.

The manifold avenues through which typhoid fever spreads involves a wide field for investigations. The studies are necessarily made in the presence of outbreaks and include many lines, such as the purity of milk supplies, the extent of the pollution of water supplies, the rôle of insects as carriers of infection, the percentage of bacillus carriers among the population in different sections of the

country, and the influence of contact as a factor in the propagation of the disease.

A large amount of data is necessary on all phases of the typhoid fever problem in order that the deductions to be drawn may be of general application. There is also necessity for a better understanding on the part of the people as to the known facts regarding preventive measures, and this comprises one of the most important duties of the Public Health Service in relation to the control of the disease.

Similar statements apply also to other preventable diseases, such as pellagra and poliomyelitis, which are being made subjects of special study. There is authority for their investigation in the laboratory, and the extent of such activities is limited only by the available appropriations. Since, however, the prevention of diseases involves improved sanitary methods and devices, additional authority must be had for studies outside the Hygienic Laboratory better to cover the field.

From the brief outline presented it is apparent that the activities of the Public Health Service relate to many subjects, and that their enlargement, in so far as relates to research, is almost wholly dependent on additional authority to be obtained.

Because of our form of government and the consequent division of responsibility among national, state and municipal agencies in respect to the public health, two of the most important duties of the federal government are, in my opinion, scientific research and the collection and dissemination of useful information. The object of the present public health movement is to prevent disease and to prolong life and make it more productive. This can be accomplished largely through universal acceptance and observance of hygienic principles by the people.

Legal restrictions are necessary and there will undoubtedly be indication for others in the interest of the public health, but when adopted they will of necessity be enforced by the states, except in those instances involving interstate relations. But the federal government will perform an important service in bringing about uniformity of action by rendering accessible the facts on which such action is based.

In the German Empire a wise policy has had such an effect.

In that country the confederation of states and free cities is looser than in the United States; yet governmental scientific research in the interest of the public health has been most productive, and the large amount of valuable statistics available was collected through voluntary co-operation of those states and cities. Theoretically the imperial government can exercise police powers in a state for the suppression of outbreaks of disease, but so far as known this has not been done nor has there been any necessity for doing so. The experience of the German Empire is of value in considering the development of future public health activities in our country, especially as relates to scientific research. The organization for such work on the part of the federal government is well founded, and in certain respects broader than in other countries. With proper development it should in time be as productive of results as any national agency.



## THE CENSUS AND THE PUBLIC HEALTH MOVEMENT

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BY CRESSY L. WILBUR,

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The Bureau of the Census, which is one of the bureaus constituting the Department of Commerce and Labor, is the only Federal agency that deals with the collection, compilation and publication of general vital statistics for the United States.

Through its division of vital statistics—one of the five divisions into which it is at present organized—it receives returns of births and deaths monthly from such states and cities as afford registration data in satisfactory detail, and sufficiently complete with respect to the total number registered to repay compilation.

The other divisions of the Bureau of the Census, as constituted for the three years of the “decennial census period” ending June 30, 1912, during which time the thirteenth census (1910) is to be taken and its results published, are those of population, agriculture, manufactures, and methods and results. One of these, the Division of Population, bears an especially important relation to vital statistics, because its data, the statement of the number of persons living in every portion of the United States, with full details of sex, age, color, civil condition, nationality, parent nationality, etc., form the indispensable basis with which the returns of births and deaths derived from registration records must be compared in order to compute vital rates.

### *Importance of an Accurate Census of Population*

Hence, first of all in the activity of the Bureau of the Census relating to vital statistics, we must place an absolutely correct census of population, or at least as correct a census as ordinary human agencies operating with the best means at our disposal and with honesty of purpose and method may be able to obtain.

The recent census, taken as of April 15, 1910, is the most perfect and complete census that has yet been taken in the history

of the Federal Government. The fact that the census has refused to accept padded returns from certain localities may have cast doubt in the minds of some upon the correctness of the census as a whole. It is very unfortunate, indeed, that local dishonesty, which has probably existed to some extent in previous censuses, should thus cast a stigma upon the work, but it is evident that no better method for the correction of such abuses is available than full publicity and prosecution of the individual offenders. Otherwise the erroneous returns of population may be used for years to come as the basis of lying rates, which the officials printing them should know to be fraudulent, although they may claim—in the absence of full investigation and rejection on the part of the Government—as in an advertising pamphlet that recently came to my attention that “*Government statistics place ————— among the healthiest cities in the United States.*” So “Government statistics,” based on a dishonest enumeration of population, did; and it is a satisfaction, indeed, that a correct count of population in 1910 relegates this city to its proper position with respect to mortality rates.

Certain cities for which the populations as first returned have proved to be grossly overstated should be thankful that correct rates will be available for 1910 and subsequent years, and that their figures will not be discredited by extravagantly low rates of mortality such as carry conviction to no one competent to judge of vital statistics. Aside from its dishonesty, the policy of overstatement of population is a short-sighted one, because the next census must likewise be padded, and in the same proportion, which means in greater numerical amount, unless a falling off in the rate of growth is to appear. And in passing from a dishonest to an honest census, an increasing rate of mortality might be shown for intercensal years, when the actual rate was constant or decreasing, so that an effective sanitary administration might be discredited by erroneous rates based upon false population returns made years before. There are ways, known to certain health offices, by which even a handicap of this kind could be temporarily overcome, and by rejecting various classes of deaths, with increasing latitude from year to year, the figures can be “juggled” to show almost any desired reduction of mortality as a whole or for certain diseases. But there will be less of this done in future, because the registration officials of the United States have now organized and adopted cer-

tain standard "Rules of Statistical Practice," which are approved and enforced by the Bureau of the Census in the transcripts collected by it and compiled for its annual reports on mortality statistics, so that a sharp discrepancy will at once appear between the census figures and those of any office that fails to make a complete and correct compilation.

A correct enumeration of population every ten years is thus seen to be the absolutely indispensable basis of correct vital statistics for the United States. In fact, this period is too long, because it is impossible to interpolate, with entirely satisfactory precision, estimated populations for the intercensal years that lie between the decennial enumerations. This is true for all countries, but is especially true for the United States, with its rapid and unusual growth in certain localities, so that it is very much to be desired that an interdecennial enumeration should be taken. This is already provided for in some States, and the practice should be made general.

#### *Collection of Vital Statistics by the Census*

Coming now to the more immediate activity of the Bureau of the Census with respect to the subject of vital statistics, it is a somewhat astonishing fact that the Federal Government has no authority, under the Constitution of the United States, directly to collect vital statistics, through the absolutely necessary means of registration of births and deaths, except in the District of Columbia, which is entirely under Federal control.

Provision was made for the first census (1790) of the United States by the Constitution so that "representatives and direct taxes shall be apportioned among the several States which may be included within this Union, according to their respective numbers," and further enumerations were authorized "within every subsequent term of ten years." Although the word "census" does not appear in the constitutional provision (Article I, Section 2), nor in the organic act providing for the first enumeration of population of the United States, there was thus instituted the line of decennial censuses which have now been taken regularly for one hundred and twenty years. The United States was the first country in the world to provide for a regular periodical enumeration of inhabitants, an example which has now been followed by practically all civil-

ized nations. It may be said, indeed, that the establishment of a regular census of population and the registration of vital statistics are the first steps taken in placing a country upon the plane of modern civilization. While the United States led the world with respect to the census of population, we still rank with the most unprogressive and semi-civilized countries as concerns the registration of births and deaths.

As stated in the work from which some of the preceding facts have been taken,<sup>1</sup> the provision authorizing a decennial census "was embodied in the Constitution for political purposes wholly, and with no thought for providing for any systematic collection of statistical data beyond the political necessities of the Government." There was certainly no thought of providing a basis for vital statistics, nor of furnishing material for the purpose of protecting the public health. Indeed, such a matter as the "public health" was entirely without the purview of the fathers of the republic, and lay unrevealed in the womb of the future. Not until the awakening to the unnecessary destruction of human lives and the beginning of modern sanitation in England in the 40's of the last century, based upon the data collected by the first modern registration law for vital statistics, namely, that passed for England and Wales in 1836, did it enter into the conception of the State that one of its chief functions was the protection of the lives of its inhabitants not only from foreign foes, but also from the more deadly and dangerous enemies of disease. Even to-day the sole authority that the United States Public Health and Marine Hospital Service attempts to exercise within the United States, aside from its peculiar function as related to the medical care of merchant seaman and in cooperation with state authorities acting under state constitutions that provide for the protection of the health of States, is derived from the provision of the Constitution permitting the Federal Government to regulate interstate commerce. Only as epidemic diseases interfere with the interstate movement of property, no matter how inefficient may be the state control of a dangerous disease, can the Federal Government intervene to protect the people of the United States.

Such a condition might well be considered intolerable, were it

<sup>1</sup> *History and Growth of the United States Census, 1790-1890*, by Carroll D. Wright and William C. Hunt.

not largely ameliorated by the cordial cooperation of state authorities in times of danger, as when yellow fever menaced New Orleans and the plague was to be stamped out in San Francisco, with the United States Public Health and Marine Hospital Service. Such cordial cooperation exists also with respect to the registration of vital statistics, and much of the progress made in recent years is due to the harmonious action of the state and city authorities with the Bureau of the Census. It is possible that stronger and more direct agencies, were they permissible, would accomplish little more, because an essential requirement in the establishment of effective registration work under our form of government is that the people shall understand its importance, and therefore support it in operation. A law without moral support cannot be thoroughly enforced in the United States.

One of the first results apparent from the national registration law that went into effect in England in 1837 was the light cast upon the conditions affecting mortality. We may justly consider the modern public health movement, that has now become perhaps the most characteristic feature of the twentieth century, a necessary consequence of the attention given to mortality statistics. In the First Annual Report of the Registrar-General of Births, Deaths and Marriages in England, London, 1839, we are struck at once with the practical sanitary importance of the deductions made by the editor, Dr. William Farr, who at once placed the work upon the firm basis, from which, through the successive annual reports for over seventy years, it has not departed. As an immediate result of such statistical information, which replaced the old haphazard guesses and inferences derived from the limited scope of bills of mortality, the progressive movement for the improvement of public health was begun, which is now proceeding in almost every country of the world with yearly accelerated pace. The impulse was rapidly transmitted to this side of the Atlantic long before any state or even city boards of health were established. Its results are recorded in the annual registration reports of Massachusetts, prepared under the Act of March 3, 1842. The best medical talent and the most progressive minds appear to have been enlisted by the Secretaries of State of Massachusetts for the preparation of these early Massachusetts reports.

The almost unanimous opinion of practical public health work-



ers in all countries is that accurate vital statistics are the absolutely necessary foundation of effective public health work. What is the reason, then, after recognition of this fact, that vital statistics are not to-day as completely and accurately registered in the United States as in most other countries?

### *History of Efforts of the Census to Collect Vital Statistics*

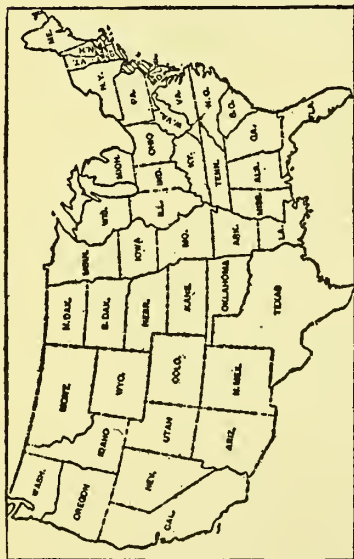
As a result of the establishment of early systems of registration, first in Massachusetts, and then in other states, much interest was aroused on the subject in various parts of the country, and provision was made in the act for the seventh census (1850) for the inclusion of the subject of mortality statistics.

The report clearly indicated the difficulty, which is an absolutely insuperable one, of collecting vital statistics by enumeration after the close of the year to which the data relate. No accurate statistics can be obtained in this manner, and the successive experiences of the eighth census (1860), ninth census (1870), tenth census (1880), eleventh census (1890), and twelfth census (1900), only served to confirm the opinion expressed in this original report of 1850, that mortality figures based upon enumerators' returns were incomplete and might be misleading. It was not until the thirteenth census (1910), however, that the method of attempting to obtain mortality statistics by enumeration of deaths at the time of taking the general census of population was entirely done away with.

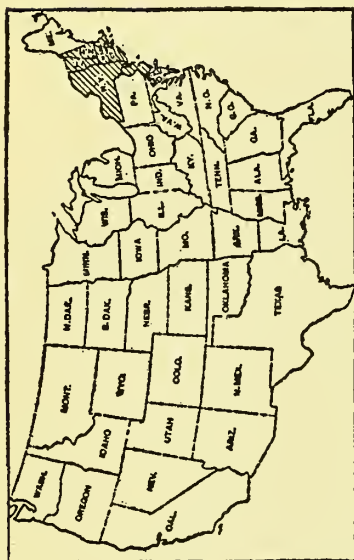
The discarding of the antiquated and pernicious method of enumerating deaths was made possible by the extension of proper methods of registration. Registration of vital statistics is a method sharply distinctive from the method of enumeration. By registration of a birth or death is meant the immediate recording of the same. That is to say, for deaths it is necessary that a compulsory provision of law be enforced that no human body shall be interred, removed from the place at which death occurred, or otherwise disposed of, until a proper legal and statistical record has been made. Such a provision can be enforced only by means of a compulsory burial or removal permit. In like manner, complete birth registration depends upon prompt reports by physicians or midwives not over ten (10) days after the occurrence of the birth, and with some method of checking failures to report. For both

## INCREASE IN THE NUMBER OF REGISTRATION STATES

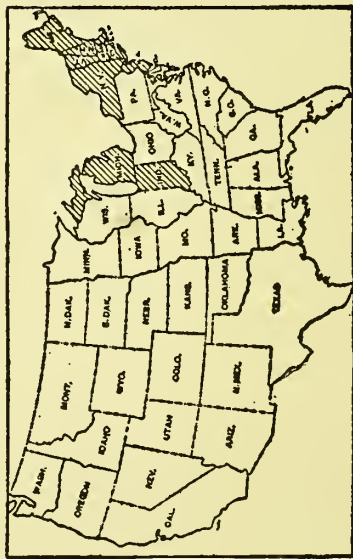
1880



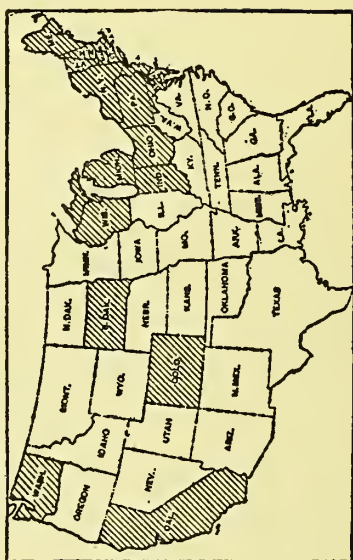
1890



1890



1910



births and deaths the essential condition for efficiency is the enforcement of the law by means of the penalties therein provided.

### *Extension of the Registration Area*

The foregoing map shows the growth of the registration area for deaths from the date of its establishment under the tenth census (1880), when it consisted only of two registration States, Massachusetts and New Jersey, and a few independent registration cities, with an aggregate population amounting to only seventeen per cent. of the total population of continental United States, up to the present time, when it includes something over one-half of the total population of the country.

An account of the development of the registration area may be found on page 18 of the little Physicians' Pocket Reference to the International List of Causes of Death, a copy of which has been sent to every physician in the United States, to medical students, health officers of states and cities, and local registration officials, and which will be sent by the Director of the Census upon request to any person interested in the movement for better vital statistics. It illustrates incidentally a most important feature of the practical work of the Bureau of the Census since its permanent organization, namely, missionary work for the extension of the registration area both for births and deaths. The crying need for this work is well expressed by the introductory paragraph of the letter of transmittal of the Director of the Census to the Secretary of Commerce and Labor:<sup>2</sup>

It seems to me that there is almost nothing more important in the entire field of statistics than vital statistics, because of their direct bearing upon the health and consequent welfare of the people. It certainly is both strange and shameful that the United States should be so far behind the other leading countries of the world in the registration of deaths, and even more so in the registration of births.

Prior to the organization of the Bureau of the Census upon a permanent basis in 1902, it was impossible for the census authorities to make any systematic effort for the improvement of registration methods. The law providing for the decennial census was usually passed at the latest possible moment, and it was then neces-

<sup>2</sup> Physicians' Pocket Reference, page 2.

sary to organize anew, without any nucleus of a permanent staff, the immense force necessary for the taking of the census of population, agriculture and manufactures, within a brief time. Little, if any, preliminary attention could be given to the methods of collection of the data of vital statistics, nor was it feasible to attempt to introduce uniform methods. Such methods could only be adopted by the concerted action of state and city registration officials, and the time available between the passage of a decennial census law and the completion of the census was too brief to enable such an organization to be completed. Hence the work of the Federal Census in mortality statistics had comparatively little influence on the development of registration methods in the state and city offices until the census was placed upon a permanent basis, and began the compilation of annual, not merely decennial, reports on vital statistics. At once a new era began and the possibility of uniform and more efficient methods was suggested.

One of the first steps taken by the Bureau of the Census in this direction was the adoption of the international classification of causes of death, which had already been accepted by the leading state and city offices of the United States, as the system to be employed in the annual reports on mortality statistics beginning with the calendar year 1900. The Bureau of the Census prepared a Manual of the International Classification, and took an important part in the second decennial revision held by the French Government at Paris in 1909, at which a special census commission, appointed under the first public act passed by the Sixty-first Congress, was present. This commission was appointed by the Director of the Census, and contained representatives of the Committees on Nomenclature and Classification of Causes of Death of the American Medical Association and the American Public Health Association, the latter representing, through its section on vital statistics, the organized registration officials of the United States. Attention should be especially called to the latter body. By the formation of a section on vital statistics in the American Public Health Association, an organization which, from its history and influence on practical sanitation in the United States, may be taken as the most representative body of sanitarians in this country, it became possible for the first time to deal with a tangible body of statistical workers, with power to act and to carry out

plans for the improvement of vital statistics in the United States. This is accomplished by means of rules of statistical practice (see Bulletin 108, Mortality Statistics, 1909, pages 37 to 42), which embody definite decisions upon important statistical methods, and include, among other recommendations, the use of the United States Standard Certificate of Death, as revised at Richmond in 1909, for use beginning January 1, 1910, a primary schedule which places the collection of the original returns of death upon a basis of uniformity. Uniform rules and instructions to be given by state and local registration officials are provided, so that physicians and others who make reports upon these certificates may do so in a uniform and comparable manner. The use of such a schedule is necessary if we are to have comparable statistics for the country as a whole, and it may be considered one of the chief results accomplished by the census that at the present time nearly 67,000,000 of the population of the country are represented by offices that either use or recommend the standard blank.

#### *Approval of the Congress of the United States*

Although the collection of vital statistics has formed a part of the decennial census since 1850, it cannot be said that Congress or the Federal Government generally, except the bureau that had the matter immediately in charge, has ever taken a very active interest in the improvement of our vital statistics.

The general interest in vital statistics that was awakened in this country during the early 50's, and which is suggested by the list of states that passed registration laws, was utterly dissipated by the intense political excitement of the later 50's and by the civil war. The cause of registration was set back at least a decade, and perhaps twenty years, and it was not until the later 60's and during the 70's that attention began to be given again to the subject of public health.

Many state boards of health were constituted about that time, and as a part of their functions the subject of vital statistics was usually included. The earlier legislation had established the collection of vital statistics under some officer of the state government, usually the Secretary of State. There were then no state boards of health. This was the case in Massachusetts, Michigan, Ohio,



Pennsylvania, Vermont, and in the Southern States where registration laws were enacted.

At the present time the collection of vital statistics is conducted by the state sanitary authorities in all States except Massachusetts, Michigan, Ohio, and South Dakota. Registration work is recognized by all practical sanitarians as the absolutely necessary basis of efficient public health service, but it is not always certain that our state boards of health, as at present constituted, will give more effective administration of registration laws than if they were placed under some other department of the state government. In all cases, of course, such work should be under medical direction, because the most important data are furnished by physicians with whom it is necessary for the central office to be in constant correspondence. Such work is medical work, and it is very desirable that special training therein should be given in our advanced medical schools, so that accomplished vital statisticians may be available for the public service, in addition to the general instruction in vital statistics that every medical student should receive. Such special knowledge should be an essential part of work for the degree of Doctor of Public Health (D. P. H.). In the practical conduct of registration matters the state boards of health have in many cases been woefully neglectful of their duties with respect to registration simply from ignorance of its importance and its fundamental relation to their work.

The general approval by Congress of the movement for better vital statistics was shown by a joint resolution adopted by Congress in 1903:

"That the Senate and House of Representatives of the United States hereby expresses approval of this movement, and requests the favorable consideration and action of the state authorities, to the end that the United States may attain a complete and uniform system of registration."

This resolution has been of very great service in calling the attention of governors and state legislatures to the importance of registering vital statistics. It is unfortunately true, however, that Congress has neglected to secure in that area over which it has sole control, namely, the District of Columbia, that uniform and complete system of registration which it recommends to the states. This applies more especially to the registration of births, which is

even at the present time (1911) admitted by the District Health Officer to be incomplete, and appears not to comprise much more than ninety per cent. of the births that actually occur. That is to say, after many years of registration in the city of Washington, which is coterminous with the District of Columbia, one birth out of every ten that occurs may fail to be registered! Congress has ample power to frame a law that will secure the registration of practically every birth that occurs in the District of Columbia, and it has ample power to secure the enforcement of such a law so that it might serve as a model that could be followed by other cities of the United States, of which there is not one at the present time with complete birth registration.

The District has not so far adopted the Standard Certificate of Death which has been such a great factor in the standardization of the mortality statistics, but there is a prospect, with the cordial recommendation of the District Health Officer, that use of the standard blank will be provided for in the city of Washington in the near future. The difficulty in securing the introduction of standard methods and of complete birth registration in the District of Columbia, under the direct control of the Federal Government, shows how difficult it is to secure the adoption and enforcement of proper registration laws in States, some of which are sparsely settled, some of which have a very large proportion of illiterate population, and many counties remote from railroad communication, when the desirable purposes indicated in the resolution of Congress cannot be carried out in practice in the Federal District itself.

*Obstacles to the Extension of Proper Registration Methods and  
How They Can be Overcome*

In taking a general view of the progress of the movement for the extension of adequate registration methods in the United States, the question arises as to what are the chief obstacles that prevent the general introduction and enforcement of adequate registration laws so that the United States may become at once, or within a very short time, abreast with the other civilized countries of the world in this respect.

The first and most important obvious difficulty has already been pointed out, namely, that no uniform law can be passed for

the entire country, but the individual and harmonious cooperation of forty-eight different state legislatures and of Congress itself (for the District of Columbia) must be sought. No person who has followed the efforts of the American Bar Association and the Commissioners on Uniform State Laws will fail to recognize the great difficulties in securing the enactment by the several States of uniform laws respecting some comparatively simple matters of legal procedure. When we consider the inherent difficulties of enforcing a registration law in a state that has never had legislation on this subject, and in which undertakers and other persons are accustomed to dispose of the bodies of the dead without let or hindrance from legal authority, it will rather be a matter of surprise that so many states have adopted, within the last ten years, laws for the registration of vital statistics that are substantially identical in principle, and in many cases in wording, with the model law. At the present time the movement for the introduction of uniform registration laws has met with more actual success than any other movement of equal scope for uniform legislation.

It is easy to secure the passage of registration laws in comparison with the difficulty of securing thorough enforcement of them when passed. The duty of enforcing such laws has been largely entrusted to the state boards of health. These bodies are composed mostly of physicians, who are appointed, in many instances, on account of their political prominence rather than because of any special knowledge or education in public health methods. Some of the members of such boards may be entirely ignorant of the importance and necessary principles of effective registration, and even the executive officers, who are usually the secretaries of the state boards of health, may enter upon the practical work of enforcing a state registration law without any previous knowledge or training whatever in vital statistics. It is remarkable and very fortunate that some public health officers, both of States and cities, have taken up the subject with interest, developed it with enthusiasm, and have done their best under existing conditions to secure enforcement of registration laws. It is easy to see, however, that when a test case arises and the state registrar undertakes to enforce the penalty of the law, that he may be hampered by the appeal of the delinquent individual, who has violated the law and who ought to be punished, to some members of the

board or to political authorities, and as a result thereof the law may practically be nullified and remain unenforced.

The failure to enforce registration laws is almost universal in this country with respect to births. In only one State in the Union (Pennsylvania) has there been any continued and persistent effort, on a state-wide basis, to enforce the law requiring physicians and midwives to report all births. The effort has been attended with marked success, and it is hoped that the example will be followed by other States. Even our largest and most densely populated States are delinquent in this respect, and it has been found under some registration laws that the delinquency was greater in the cities than in the rural districts. Until within a few months no effort has been made to secure complete registration of births by systematic enforcement of the penalty of the law in even the largest city of the United States and the second largest city in the world. The first recommendation of the Advisory Board, recently appointed by Commissioner Lederle to consider the vital statistics of New York City, was as follows:

The most important improvement which it is now ready to urge is the adoption of the following means for securing the thorough registration of all births:

1. Verification of the birth registration of every infant dying under one year of age in order to detect omissions.
2. Strict enforcement of the law providing a penalty for an omission to record a birth in every case thus brought to light.

This recommendation was at once adopted by the Board of Health, a number of prosecutions have been conducted, fines collected, and it is likely that a beginning has been made for more thorough and complete municipal registration of births in this country.

The great difficulty in securing complete birth registration, which can only be accomplished by the enforcement of the law and the prosecution of the comparatively few delinquents, is the fact that the health officers are dependent upon their popularity with the medical profession, both for appointment to the offices that they hold, in some cases, and for help in carrying out various methods of sanitation which they deem of greater importance than the thorough registration of vital statistics. It is necessary, therefore, that the health officials of the United States be educated as to

the fundamental importance of correct vital statistics, and brought to realize the fact that more can be gained in the long run by establishing a sound basis of registration than by following one pet fad this year and another the next without any correct knowledge as to their actual results.

The paper by Samuel H. Adams, in "The Survey" for the week of December 17, 1910, entitled, "Mixing Hygiene with Politics," or "Tomfoolery with Public Health," indicates how dangerously the various functions of a public health office, whether state or municipal, may be twisted or may be warped to the public detriment. This is especially true of the practical conduct of vital statistics, which is often relegated to an untrained and totally incapable person. The resulting worthless data may then be used by an equally untrained health officer, so that the public and press may be entirely deceived as to the actual conditions. No help can be expected from services of this character in the thorough enforcement of registration laws, because such thorough enforcement will tend to disprove the fallacious data and conclusions presented.

An effort has been made to improve the general condition of vital statistics in the United States by building up an effective organization of registration officials, and by so doing to improve the *morale* of the service, and its standing as a necessary practical division of public health service. The attempt has been to some extent successful, and the rules of statistical practice have already justified themselves in practical use. Some registration officials will continue to neglect or ignore them, and there is, of course, no compulsion for their use, except through the general education of public and statistical opinion, so that the worthlessness of some of our present municipal reports will cause a demand for their immediate abolition or reform. It is, indeed, only by building up public and professional sentiment by continually pointing out the importance of accurate registration and by teaching the public generally, and the medical profession more particularly, to condemn lax and inefficient methods, that marked improvement can be secured in the United States under our present conditions. The hearty cooperation of the American Medical Association, the American Public Health Association, the American Federation of Labor, and the beginning cooperation of the American Federation of Women's Clubs, are significant of the commencement of better things.



The census has been for many years as the voice of one crying in the wilderness, and its heretofore neglected appeals are only recently beginning to bear fruit in effective and enforced legislation. It will be many years to come, however, at the present rate of progress, before we can expect complete registration of vital statistics, including both births and deaths, for the entire United States. Not only the nations of Western Europe have long surpassed us in this respect, but also the nations of the Orient may perhaps do so. Japan has maintained for many years most excellent reports on the movement of population and statistics of causes of death embracing the entire empire. These were established very soon after the adoption of the most important methods of western civilization, and the annual reports surpass anything that will be possible for the United States at the present rate of progress for half a century to come. China has just taken its first census, and very likely will proceed to the establishment of a registration system. The new government of Turkey will doubtless proceed to remove the reproach that has heretofore rested upon that country in this respect.

Perhaps the fundamental difficulty lying at the root of our trouble in securing accurate vital statistics for the United States, and, more particularly, complete statistics of births even for cities where registration systems have been established for many years, is the American's disregard of law. Neglect of the requirements of law would seem to be a general characteristic of the American people, and the failure and neglect of vital statistics laws are only special cases. How can one expect that provisions for registration of births and deaths—the importance of which is not fully appreciated even by some physicians, let alone the people generally, the bar, and the courts—should be enforced when crimes of active violence may not be punished? Every American assumes, in his own person, to be a court of last resort, so far as passing upon the desirability or expediency of any legal provision with which he may come into conflict. If it agrees with his habits of thought to submit to the law, very well; and if not, he calmly pronounces it “unconstitutional,” and it practically becomes unconstitutional for him in the majority of cases, because the officials charged with the enforcement of the law may not care to take the necessary trouble, or they may be afraid to institute the necessary legal proceedings, for the imposition of a fine or other penalty.

There is some ground, indeed, for the disrespect that American citizens have for laws, because of the absurd number of statutes that are ground out biennially by the legislatures of the different states. Many of these laws are ill considered and not practical in operation. Even the members of the legislatures that pass them do not expect them to be enforced. The United States, in spite of its lack of effective registration, has been plastered over with laws for the registration of vital statistics, many of which could have been known to be worthless and ineffective before the governor's approval was secured, just as well as after years of ineffective operation.

It has been one of the most important tasks of the Bureau of the Census to aid in the proper understanding of the essential principles that should govern in the construction of registration laws for births and deaths, to advise state sanitary officials and committees of legislatures in regard to the proper construction of such laws, and to deter, as far as possible, the passage of too highly specialized and comprehensive laws in states in which there is no reasonable probability of securing full enforcement and satisfactory results. Persons who become interested in vital statistics, and to whom the knowledge of the lack of registration in their own states comes for the first time with the effect of a sudden shock, not infrequently desire to remedy the evil all at once by "passing a law," and expect some sort of a miracle to be worked by which, with the utmost laxity of administration and with perhaps altogether inadequate financial provisions, their state may come at once to be accepted as a part of the registration area.

We have few miracles nowadays, and it seems better and more reasonable to institute legislation only so far as it can be carried out. This advice, however, is not often accepted, and usually the cry is insistent for a complete law. The only instances in which the progressive method has been employed are in the cases of Michigan, which passed its death registration law in 1897, and later, in 1905, after the law for the immediate registration of deaths had proved itself a success, instituted a similar law for the immediate registration of births; and the State of North Carolina, the first state in the South to institute a modern registration law in 1909, but which, in the wise judgment of Dr. Richard H. Lewis, was restricted to the complete registration of deaths, by burial permits,

in municipalities of 1,000 population and over, with a provision making the mayor responsible under penalty for thorough enforcement of the law. The law is now in operation, and will be extended to cover the entire state, and to include births, just as soon as the results justify such action.

### *Hope for the Future*

We have seen how many obstacles intervene in the way of bringing the United States to the position occupied by other countries with respect to the recording of the data of vital statistics. There is a brighter prospect, however, in the awakening public interest and the special attention that has been given to the importance of this subject as the fundamental basis of the conservation of human life and the movement for a national Department or Bureau of Public Health.

All the effort for better health administration in the United States, and for the establishment of a national public health service, is more or less directly an effort for better vital statistics in the United States. This is true, because a public health service, whether of a city, of a state, or of a nation, is a cripple without dependable vital data. The duty of such a national public health service would be to see whether more could be done than has been done by the Bureau of the Census to bring about the complete registration of vital statistics in the United States, under a uniform system, and so related to the Federal service that the results might be utilized promptly and with full confidence. Nevertheless, in all the discussions and arguments on this question, including the outline of bills for the organization of such a service, little practical attention was given to the subject, and no suggestions whatever were presented as to any means by which better registration can be obtained in the United States.

The same neglect, in fact, that now hampers the efforts of the state and city offices that fail to make use of their vital statistics, and to insist on the thorough enforcement of their laws seems to attend the representations made with respect to the Federal service. A Federal health department would have no more legal authority to register births and deaths directly than has the Bureau of the Census, and certainly no more cordial cooperation could be desired than has been given by the state, and by nearly all city health

authorities to the movement for better and more comparable vital statistics. Perhaps the enthusiasm attending the creation of a new department would cause some additional activity, but spasmodic interest alone will not cause state legislatures to enact, and state sanitary authorities to enforce, laws that Congress itself is apparently unable to carry out for the District of Columbia. Nevertheless, I believe it is perfectly practicable, if there should be a real demand for better vital statistics and if Congress should be actually aroused to the importance of proper registration, to institute a thoroughly cooperative registration service by state authority for the collection of the data under Federal supervision for the precision of methods and results, that could be made to cover the entire United States within a brief period, and that would prove practical and effective in operation.

## SOURCES OF INFORMATION UPON THE PUBLIC HEALTH MOVEMENT

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### *Introduction*

Someone has called vital statistics the Cinderella of modern public hygiene. She sits in the chimney corner and sifts the ashes of dusty figures, while her proud sisters, Bacteriology and Preventive Medicine, go to the ball and talk about the wonderful things they have done. In the absence of statistics visionary theories are set forth, so contradictory that scientific reasoners and business men give little attention to them. We know social facts completely when we measure them. We cannot measure social facts without statistics. They are the testing instrument for theories and schemes of social reform; they show us where to look for the causes of social maladjustments; they become the basis of the great preventive campaign which characterizes the movements toward social betterment at the present time. Consequently, the quantitative study of social phenomena is attracting the attention of an increasing number of students to-day.

Sound vital statistics are the necessary basis of modern sanitation and register clearly the steps in the campaign against preventable diseases, often pointing the way to the next step. They furnish a definite measure of the value of sanitary improvements. Pittsburgh spends \$5,000,000 on a new filter plant and the death rate from typhoid at once falls. Havana is cleaned up by the United States Government and the yellow fever scourge subsides. Statistics register the progress of medicine and surgery. Antiseptic surgery comes into use and the death rate from operations, especially in war, declines to a remarkable degree. Vital statistics furnish the basis of an approximate estimate of national health.

In the present paper the sources of statistical data will be discussed and criticised from the point of view of their accuracy and completeness in the United States. Some comparison of public



health statistics in the United States will be made with foreign countries. Caution in the use of material and care in interpretation will be emphasized by the presentation of concrete examples of error. Finally, some of the problems of the public health movement upon which statistics may throw light will be suggested and illustrated by concrete material.

## I. SOURCES OF STATISTICAL INFORMATION

### 1. *The United States Census Reports and Bulletins*

The United States is far behind the other great civilized nations in the field of vital statistics, which includes a record of deaths, births, and marriages—a field most closely touching the interests of the people through its connection with public health. Frontier conditions long proved an effective bar to the development of public records of births, deaths, and marriages. The scattered population and the individualism which has always been impatient of official interference in America—both hindered an accurate registration. The official census was taken but once in ten years, and the data thus secured were out of date before the results could be published. The need was for an annual record. This involved accurate and complete state and local registration which has not been secured in many of our states. In 1880 records of death based on an effective system were obtained from about one-sixth of the population of the country, but this area had enlarged in 1909 to include five-ninths of the population—the *registration area*, as it is called. This area does not include the Southern States because their records of deaths are not sufficiently complete. No longer, therefore, do the returns on vital statistics come from the enumerators of the decennial census. Since the establishment of a permanent Census Bureau returns are received monthly from the registrars of state and local mortality in the registration area, and the results are published each year in a special report on "Mortality Statistics."

The accurate and complete record of all deaths is important because the rate is an index of the condition of the different communities from year to year—the relative healthfulness of different localities and occupations; of different age and sex groupings. It shows up evil influences in city life and reveals the dangers accompanying civilization.

The usual method of securing a record of deaths is to require a burial permit, to secure which a death certificate is necessary, made out by the physician who attended the deceased at death, stating age, occupation, cause of death, etc. One great difficulty in the way of accuracy has been the lack of uniformity in this blank form of certificate. Perhaps no single step taken by the federal bureau has meant so much for the welfare and sanitary protection of the American people as the successful introduction of the "standard certificate."

The difficulty of classification of the causes of death is a constant source of error and lack of uniformity. Medical men have made very imperfect returns of the causes of death as a result. What do we know about the real incidence of tuberculosis when health officers allow deaths to be reported so that they can only be classified as, "Probably tuberculosis?" There is much deliberate suppression of such causes as alcoholism and syphilis. Sometimes there is more than disease present, or disease and accident together. The adoption of the Bertillon system of classification of the causes of death over the registration area and outside has added greatly to the uniformity of mortality statistics, and renders the results in different places comparable.

An important aid in securing accurate statistics would come from better training on the part of those who are entrusted with the registration of vital statistics. The recent rapid development of the public health movement has increased the demand for this training. In England, where vital statistics have reached their highest development, medical officers of health are usually graduates of great universities and, besides, of a special course on public health in which a diploma is given.

In the United States the registration of vital statistics and the supervision of local health matters is as likely to be entrusted to a civilian as to a physician—at least to one who has devoted little time or thought to the larger problems of public health. The work of a statistician has not yet been established as a profession. Since 1850 there have been eight directors of our census, an average length of service of four and one-half years. If we compare the careers of the seven persons most conspicuously identified with recent census work in England, France, Germany, Prussia, Italy, Austria, and Russia, we find the average official life and work in statistics

has been twenty-six years, or about six times that in the United States. The accuracy and completeness of the statistics published by the United States Census Bureau depend upon the efficiency of local registration officials. An examination of fifty-six cities of the United States showed that in all except eight the work of registration is entrusted to the health officers, as it should be. In all but four the permit before burial is in force. A number of cities direct that the physician sign the certificate within a specified time, but most cities make no provision for a certificate of death which occurs without an attending physician.

One of the greatest needs for the public health movement is more accurate records of occupational mortality; and, in addition, data from which the morbidity rate may be calculated. The annual reports now publish mortality by age, sex and occupation, but the United States has almost nothing as to the morbidity rate. This one-sided information results in wrong conclusions from the federal statistics, for instance, as to the death-rate among women factory workers. It appears lower than for any other class of society—the truth being of course that few women die as factory workers, because when death overtakes them most have passed into the class of housewives. Nevertheless, their occupation may have been fatal in undermining health.

Besides, the mortality statistics do not give really accurate information, because the classification of the trades is not sufficiently discriminating. For example, the man working at the metal polishing wheel is classed with other metal workers. As a result, the federal figures do not show the enormous death-rate from pulmonary diseases among metal polishers. For these data we must go to the records of the Metal Polishers' Union.

In older European countries injury to health in the trades is studied and controlled by the government. The physicians of Germany, France and Great Britain are alert to the close connection between occupation and disease.

The accuracy of figures on occupational mortality depend upon: (1) correct statement of occupation and age in the enumeration of population in the United States census; (2) correct statement of occupation, by the same classification as for the United States census of population, and correct age upon the death certificate; (3) precise statement of the cause of death upon the certificate.

The data are derived from two different and largely independent sources. The returns of death, received from the registration states and cities, are copies of the death certificate made out by physicians or relatives. But the occupations of the living population are stated by the census enumerators according to instructions. The accuracy of statement may vary greatly in the two sets of returns even if the classification of occupations be the same in the two cases, which is likely not to be the case. But the only method of getting at the death-rate peculiar to any given occupation is to compare the mortality in that occupation with the number employed for that occupation according to the population returns. This comparison was attempted in the 1900 census, and since that time in the annual reports on mortality. There is still another difficulty. The population in inter-census years must be estimated for each occupation. This cannot be accurately done for more than five years after the last general census. This is an argument for a population census every five years. Thus, in the "Mortality Statistics" for 1908 it was necessary to state simply the percentage which mortality from a certain cause formed of the mortality from all causes in the given occupation. It may be said that the English figures for occupational mortality are much more complete and accurate. What is needed in the United States, both for mortality statistics and for population statistics, is a list containing all the more important individual occupations, with an exact statement of the terms included under each, so that all, whether census enumerator or physician or undertaker, may comprehend and make a uniform and comparable classification of occupations.

*Mortality of Children.*—The deaths of children should, if possible, be recorded by single months for the first two years of life and for the most important causes of death. This is not done in the United States.

In England and Wales infant deaths are recorded only during the first year by months, but in Berlin the record is by months for the first two years. These facts are of great importance in the problem of infant mortality. Besides, there should be a distinction made between deaths of children breast-fed and bottle-fed, since these data throw light on the solution of the problem of infant mortality.

On page 50 of the annual report of the medical officer of health

of Blackburn, England, the particulars of the nursing and feeding of 2,705 children under 7 months old are given.

*Registration of Births.*—In the "Supplementary Analysis of the Twelfth Census," page 237, we find the following statement: "The twelfth census contains no statistics of births or marriages. It has been found impracticable to gather information through census enumerators regarding either the births or the marriages that occurred during the census year with enough completeness to make the resulting figures worth the cost. The records of state or municipal registration offices upon births and marriages—the only alternative sources of information—are often lacking, and where they exist are incomplete in so many cases that no satisfactory statistics of births or marriages for the United States can be derived from them." In his contribution to the "Report of Vital and Social Statistics of the Eleventh Census," published in 1896, Dr. Billings stated: "We have no fully complete and accurate registration of births in any part of the United States." W. A. King, chief statistician for vital statistics in the twelfth census, began his discussion of births by admitting that "the data relating to births are the most incomplete and unsatisfactory of any treated in this report. Were it not considered desirable to give such results as bear upon the question for the information of students of statistics, the subject might be dismissed with the statement that they are entirely inadequate to determine, directly, the general birth rate of the country, or, what is of equal practical importance, the relative birth rate of different classes of the population."

The registration of births is extremely important for the knowledge of infant mortality, for the protection of infant life, and for securing the legal rights of children. Yet, not a single State in the Union, nor a single city of any considerable size, makes positive claim that it registers as many as nine births out of every ten that occur. Even the city of Washington, whose law for this purpose is a direct enactment of Congress, does not exceed this limit of efficiency. "The registration area for births consists of a few interrogation points." It was not until 1891 that the annual number of recorded births in New York City exceeded the number of deaths.

The total number of births must be known before a computation of infant mortality can be made which will be comparable with



the rates given in the vital statistics of all civilized nations except the United States. The infant death rate depends upon the comparison of deaths under 1 year of age with the total births. In this respect the infant death rate differs from that of other age groups, which is a comparison of the deaths at a given age with the population living at that age.

In the absence of accurate registration of births, the United States census has been at a loss to compute birth rates. The only way to obtain an approximate estimate for the whole country, or for a State, is to take the number of children under 1 year of age, found living at the date of the census, and add to this the number of children who died during the census year and who were born during that same year. In absence of accurate data for computation of the birth rate, the census officials resort to the method of comparing the number of children in the population to the number of women of child-bearing age, from decade to decade, in order to secure evidence as to the decline of the birth rate, as described in Bulletin No. 22, of the census. Thus, the ratio of the living children under 5 years of age to each 1,000 living women of child-bearing age is used as the best available substitute for the birth rate in the United States since 1850. But this ratio is not comparable with other countries which have accurate registration.

## *2. State and Local Reports of Vital Statistics*

The collection of vital statistics received its first impetus in towns where registration of deaths was desired for sanitary ends. Dr. Edward Jarvis states that New York City began to publish mortality statistics in 1804; Boston in 1813; Philadelphia in 1825, and Baltimore in 1836. The States in which these cities are located did not legislate until later. The most striking characteristic of these state and municipal reports is their lack of uniformity. The data of one State or city are, therefore, not comparable with those of another State or city. In fact, these local reports are not sufficiently uniform to admit of the comparison of the data in successive reports. As pointed out earlier in this paper, the officials to whom the work of registration has been intrusted in the United States have not had sufficient training either in statistical method or in the importance of the various public health problems. The adoption of the "standard certificate" of death, and the wide adop-

tion of the Bertillon system of classification of the causes of death, have brought a greater degree of uniformity into mortality records. Nevertheless, the accuracy of registration still depends in large measure upon the efficiency of the local official, who may correct errors on the certificate of death if he is sufficiently alert to its importance.

The American medical press is not critical enough of the contents, nature and objects of local health reports. As yet, there is no clear recognition of the real local value of such reports. As a result of a more careful and scientific study of vital statistics, it may be possible to set forth clearly that the great waste of life can be diminished by measures to prevent accidents or the unnecessary prevalence of disease.

Local health reports fail to make a careful study of the local mortality as affected by race, nativity and occupation. If the ages at death are given at all, they are generally given by arbitrary divisional periods of life. Rarely is any information published locally as to mortality by occupation, and yet this is essential to a knowledge of the relative influence upon the health of workers of various occupations.

Mortality from special causes, by streets or by wards, is often useful information in locating the causes of disease. In Liverpool, England, for example, to emphasize the prevalence of diarrhœa in 1905, a table was prepared showing the mortality by streets on which three or more deaths from this disease occurred. The Boston Registry Department gives a full account of the elements of the population and the mortality of every ward in the city. Most reports of boards of health give an elaborate analysis of mortality by months, instead of giving the necessary data by ages at death. For many important purposes, age and sex distribution are needed, while the distribution by months is of only limited significance.

Wherever the colored population exceeds 10 per cent. of the total, the mortality should be separated by color. The mortality rates are so different in the two elements of population, that frequently comparison of two places with different proportions of white and colored is impossible unless the mortality is stated separately for the two races. The same would be true in comparing different wards of a city.

The health and mortality of school children of 6 to 14 years

of age is a matter of great concern at present. The school officials might be requested to report, week by week, the deaths among their pupils. A table could then be constructed at the end of the year, showing the average number of pupils in different schools according to grades, with the mortality in each, together with a statement of ages at death and the principal causes of mortality. These data would throw light upon the problem of school hygiene.

Mortality from trade diseases and accidents is of the greatest concern to those interested in the preservation of national vitality and efficiency. Present local methods of presenting occupation-mortality statistics, where they are given at all, are usually very crude, and the tables are of little value. The best work in this field is found in England, in the reports of Sheffield and Blackburn—the former for the cutlery trade, the latter for textiles. The Blackburn report might serve as a model for such cities of the United States as Fall River and Lawrence. Such tables in the United States would afford an accurate insight into the extent of industrial disease. For these data in this country we must depend upon insurance companies, labor unions or private investigations. The Rhode Island reports state only the average age at death among men dying in different trades, instead of giving age distribution by periods of life and the more important causes. Where the reports are limited to specific trades (*i. e.*, textiles), the causes of death need not be extended beyond tubercular and respiratory diseases and accidents. Dangerous trades where accidents are likely to occur (*i. e.*, iron and steel) should be reported in detail—every fatal accident, with age, specific occupation and cause of death. The agitation for workmen's insurance or compensation should rest upon accurate data, which at present, in the United States, do not exist.

Besides what has been already said as to the inadequate provisions for the registration of births, the local importance of the earliest possible registration of births needs emphasis, in the interest of public health and the movement against high infant mortality. Early registration facilitates the work of the health visitor and sanitary inspector. The New York law requires report within ten days, and imposes a \$100 fine, in addition to making the failure to report a misdemeanor. Some States offer a fee to the physician for registration of births.

3. *Reports of Hospitals and Institutions for Defectives, Dependents and Delinquents*

For hospitals, most of the reports are decidedly defective and more or less misleading. Cases are duplicated, and there is lack of uniformity in description. Improved methods are needed, and it seems advisable for local health officers to insist upon accurate and specific returns from such institutions, in order that the real mortality rate may be known. The mortality record should show, in a special table, the deaths of inmates by age and cause of death, with a statement of the average number of inmates. These tables would correct wrong conclusions as to the healthfulness of particular localities. Furthermore, the deaths in institutions should be redistributed, according to the place of residence of the deceased, to prevent errors, which are especially serious in the case of hospitals for the treatment of special diseases, which attract large numbers from outside the locality. Not even New York City makes a proper redistribution. London does make this correction. The tables of institutions do not, as a rule, conform to the method of showing mortality at different ages and for specified causes.

*Defectives, Dependents and Delinquents.*—The president of the National Conference of Charities and Correction, in his inaugural address in 1891, discussed state and national registration of defectives, dependents and delinquents. He pointed out the fact that before the tables of the decennial census were issued they ceased to have scientific value. Reports in the States, he characterized as lacking in completeness, uniformity and scientific methods. He proposed to introduce the efficient methods of the charity-organization societies, as illustrated from their experience in New York, Boston, Buffalo and Indianapolis, into state boards of charity, in order to secure accurate registration and classification. The conference has a committee on statistics which makes a report at each session and seeks to promote uniformity and completeness in records.

There is no lack of statistical output, but the product is unfinished and largely indigestible. Busy men and women have no time to disentangle real information from unrelated masses of data. We have not even a trustworthy quantitative measure of the feeble-minded in the United States. The numerical strength of the insane

outside of institutions is unknown. Current institutional statistics are not of a sort to greatly promote our knowledge of insanity as a social phenomenon. Not long since, a foreign official asked for the statistics of the number of persons in the United States supported through public outdoor and indoor relief. He was astonished by the reply that the facts were beyond any one's knowledge. He wished, further, to learn the number of destitute children cared for by public and private agencies. Only the roughest estimate could be given.

There is a woeful lack of competent statistics of poverty and pauperism. We need more data and better analysis. Theories of social amelioration should be based upon a thorough study of the facts, and the results should be tested by careful records. The reports of the census office in 1906 on paupers in almshouses and benevolent institutions, prepared by John Koren, expert and special agent, mark the beginning of a new era of intelligent inquiry—the first step for a proper understanding of the existing state of the social ill health. For the first time we possess a definite basis of fact as to the extent of pauperism in the United States. In foreign countries more has been done on this problem, because it is more pressing. An interesting attempt at international comparison will be found in the second series of reports on British and foreign trade and industry. This report includes much statistical material on poverty and pauperism in the most civilized countries, including the United States. Want of uniformity in American statistics, however, made it impossible for the report to utilize other than the state returns of New York, Massachusetts and Minnesota, which are scarcely representative of the country.

The German Union investigated seventy-seven German cities, and published the results in 1886-1888. A committee of statisticians formulated a plan and secured the co-operation of the relief officers of the various localities. In each city cards on a uniform scheme were furnished. The work was done by government officials, directed by a committee of the Union, and paid for by the cities. A rate of dependency was thus calculated for seventy-seven cities, with a population of over four millions.

The centralized system of the English Local Government Board furnishes each year very complete statistics of outdoor and indoor relief. In the United States the charity-organization reports are



valuable, but no statistics exist that compare with those of England and Germany. The reports of state boards of charity are, as a rule, so imperfect as to be exasperating to the investigator. The committee of the National Conference collected data for a year, and then had to report that "your committee does not pretend to offer complete statistics for even one community." And yet it is not too much to say that correct and uniform records lie at the foundation of modern charity work.

In correction, a German investigator declared as to American conditions: "They are lacking complete statistics in each case." We leave practically unworked the primary sources of information; *i. e.*, the records of police courts, grand juries, etc. A statistical test has never been applied to our system of penology as a whole. Our bookkeeping is so imperfect that we do not know, even approximately, the extent of the local juvenile delinquency problem.

I shall enumerate other sources of information on matters related to the public health movement, without detailed criticism:

(1) Reports of local charity-organization societies, medical societies, tuberculosis associations and labor unions.

(2) Records of insurance companies.

(3) Commissions on the problem of industrial accidents and their compensation.

(4) Annual school reports.

(5) Special reports on the following topics:

*a.* "Immigration," by the commission.

*b.* "Women in Industry," by the Bureau of Labor.

*c.* "Workmen's Budgets," by Robert Chapin and Mrs. L. B. More.

*d.* "Industrial Accidents and Dangerous Trades," by the Bureau of Labor.

*e.* "Wages," Twelfth Census.

*f.* "Child Labor," by state and local agencies.

*g.* Report on "National Vitality," by Irving Fisher.

*h.* Backward school children; physical defects.

## II. CAUTION IN THE USE OF STATISTICAL DATA NEEDED

We live amid a wilderness of recorded data. Prophets seize eagerly upon the chaotic mass embodied in reports called statistics, and appropriate such facts as meet their needs—then they proclaim

this version of the facts as the truth. Some one declares that 500,000 persons have received relief in New York City during the last year; another exclaims, "I hear the wail of 2,000,000 children who are in want"; still another is sure that his statistics prove that the jails, almshouses, hospitals for the insane, and most other public institutions are chiefly populated by immigrants.

When two quantities are compared we must consider whether they are comparable. If we compare the general death rates of two cities in which there are widely different proportions of colored and white population error will be sure to arise because of the higher death rate among colored, if we conclude as to the relative healthfulness of the two cities from the figures given. It is never safe to take published statistics at their face value without knowing their meaning and limitations. The actual use and appreciation of statistics is ultimately a matter of intelligence, special knowledge, and common sense. The following are illustrations of error:

(1) The Census of 1890 presented very wrong inferences from some of its statistics. It was claimed, for example, that for each million of the foreign-born there were 1,768 prisoners, while for each million of the native-born there were only 898. These facts, so it was claimed, showed a tendency to criminality among the foreign-born twice as great as among the native-born. But this inference overlooked a most important fact—*i. e.*, that criminals are recruited mainly from adults, and that the proportion of foreign-born adults to the total foreign-born population is much greater than that of the native-born adults to the native population. The latter includes many more children. If we compare the number of male prisoners with the number of males of voting age, a very different result appears. The number of male prisoners per 1,000,000 of voting age in 1890 was as follows:

Native white of native parents.....	3,395
Native white of foreign parents.....	5,886
Foreign whites .....	3,270

In this analysis, age for age, the foreign-born show a lower rate than the native-born. Besides, the table shows criminality among the native-born of foreign parents twice as high as either of the other groups. This requires an explanation and a remedy.

(2) The report of the Secretary of War in 1899 discussed the  
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rate of death from diseases in the Philippines among the soldiers (17.2 per 1,000). He compared this rate with rates among the general population in Washington and Boston, and it appeared not excessive when so compared. But such comparison of the death rate of soldiers, mostly 18 to 30 years of age, could not be made with a city population of all ages, including infants, where the death rate is so high. Besides, soldiers represent a selected class. If he had compared the rate for soldiers with the rate among the general population, 15 to 45 years of age, he would have observed it to be about 10.9 per 1,000, which would still not have allowed for the selected class. If he had compared the rate in the Philippines with the rate among United States soldiers before the Spanish war he would have found it to be four times as great.

(3) If we consult the table on mortality among males and females in 1908 for the registration area, Bulletin 104, the following appears: *Percentage of gainfully employed to the whole number of deaths*—

Age Grouping.	Males.	Females.
All ages .....	52.3	8.3
10-14 years .....	4.0	1.7
15-19 " .....	58.3	25.7
20-24 " .....	82.7	28.0
25-34 " .....	86.5	19.2
35-44 " .....	85.7	16.2

If the conclusion followed from these figures that mortality of women in industry is slight, it would overlook the important fact that many women have left industry and became housewives when diseases prove fatal. For exact conclusions we need facts—*i. e.*, the morbidity rate among women in industry.

(4) Suppose we have two cities of 1,000 each. We assume the same death rate for each at the same ages—*i. e.*, under 10 years, a death rate of 100 per 1,000; over 10 years, a rate of 10 per 1,000. The distribution in town A by ages is 100 under 10 years, and 900 over 10 years; in town B, 150 under 10 years, and 850 over 10 years. Therefore, the crude rate for A will be 19, and for B 23.5 per 1,000. This apparent difference is caused by the presence of a larger proportion of children in B among which the rate is always higher—the difference is not due to difference in healthfulness of the two towns.

It is, evidently, impossible to compare the healthfulness of two localities until differences in the death rate due to different age-grouping have been excluded. If comparison is made on the basis of the crude uncorrected rate error may result. Statistical method has a way of correcting death rates for difference in sex and age-grouping which will render the results comparable in determining relative healthfulness.

(5) The chief function of statistics is to show correlation of data and thus arrive at the relations of cause and effect. But often a single correlation leaves out of consideration other important correlations. An instance of this error is found in the annual report of a western college in which comparison of the average standing and failures among non-smokers, moderate smokers and excessive smokers is made:

	Non-Smokers.	Moderate.	Excessive.
Number of Students .....	111	35	18
Average for year .....	85.2%	73.3%	59.7%
Percentage of failures .....	3.2%	14.1%	24.1%

From these data it was concluded that smoking was the cause of the failure of a very large percentage of those who smoked. The correlation is clear but the explanation is not adequate. The men who smoked in that college were those who for other reasons would have valued other things more than marks. They went in society, they were prominent in athletics, or they were the fellows who did not come to college to study. Smoking was one of the things they did to pass the time.

If space permitted, this paper would be made much more complete by a presentation of some concrete data on such problems as tuberculosis, medical inspection in the schools, infant mortality and trade diseases and industrial accidents, which would make clear just how statistics may throw light upon the problems with which the public health movement is most concerned. Prevention means getting at the causes, and statistics show where to look for these causes. The removal of the causes then becomes a matter of public policy, the results of which are to be tested by a further collection of statistical data. Thus the beginning and the end of the movement toward social amelioration appeals to the science of statistics for its aid and guidance.

In conclusion, the great needs seem to be for a more complete and accurate registration of local vital statistics, greater uniformity in classifications, more training on the part of those who have charge of the records, and a higher appreciation of the usefulness of statistical data. The National Government may perform at least two functions in the great public health movement—*i. e.*, (1) investigation and (2) dissemination of information. To do this there is need for a Bureau of Public Health which shall become the central investigating agency and depository for the results gathered from the whole country. This bureau will seek to promote uniformity of classification which will make the results comparable, and will inform public opinion by well-ordered and authentic facts.



## WORK OF THE COMMITTEE OF ONE HUNDRED ON NATIONAL HEALTH

BY WM. JAY SCHIEFFELIN, PH.D.,

Chairman of the Executive Committee of the Committee of One Hundred  
on National Health.

Professor J. P. Norton, of Yale, in a paper read in June, 1906, before the Economic Section of the American Association for the Advancement of Science, showed that the country is suffering great economic losses from preventable sickness and premature deaths. He advocated the creation of a National Department of Health, which should spread throughout the country a knowledge of effective ways of stamping out disease, as the Department of Agriculture has done in the case of cattle. As a result of this paper, a committee of one hundred on national health was appointed to study its subject, and to put into effect the best methods for securing its object. The committee elected Professor Irving Fisher, of Yale, president. It was later voted by the association that the committee,<sup>1</sup> instead of merely representing its economic section, should

<sup>1</sup>The present make-up of the Committee is as follows:

*President*—Professor Irving Fisher.

*Vice-Presidents*—Ex-President James B. Angell, Ann Arbor; Ex-President Charles W. Eliot, Cambridge; Rev. Lyman Abbott, New York; Miss Jane Addams, Chicago; Mr. Felix Adler, New York; Hon. Joseph H. Choate, New York; Archbishop Ireland, St. Paul; Hon. Ben B. Lindsey, Denver; Mr. John Mitchell, New York; Dr. William H. Welch, Baltimore.

*Executive Officers*—Chairman Executive Committee, Wm. Jay Schieffelin, Ph.D.; Secretary, Edward T. Devine, Ph.D., LL.D.; Treasurer, Title Guarantee and Trust Company, 176 Broadway, New York City.

*Committee of One Hundred*—Dr. A. C. Abbott, Philadelphia, Pa.; Rev. Lyman Abbott, New York City; Samuel Hopkins Adams, New York City; Miss Jane Addams, Chicago, Ill.; Felix Adler, New York City; William H. Allen, Ph.D., New York City; Ex-President James B. Angell, Ann Arbor, Mich.; Dr. Hermann Biggs, New York City; Dr. Frank Billings, Chicago, Ill.; Miss Mabel T. Boardman, Washington, D. C.; Edward Bok, Philadelphia, Pa.; Mrs. Ballington Booth, Montclair, N. J.; C. Loring Brace, New York City; Bishop C. H. Brent, Manila, P. I.; Dr. Joseph D. Bryant, New York City; Luther Burbank, Santa Rosa, Cal.; Andrew Carnegie, New York City; Prof. James McKeen Cattell, New York City; Prof. R. H. Chittenden, New Haven, Conn.; Hon. Joseph H. Choate, New York City; Dr. Thomas D. Coleman, Augusta, Ga.; Prof. John R. Commons, Madison, Wis.; Dr. Thomas Darlington, New York City; Edward T. Devine, Ph.D., LL.D., New York City; Mrs. Melvil Dewey, Lake Placid, N. Y.; Dr. A. H. Doty, New York City; Thomas A. Edison, Orange, N. J.; Ex-President, Charles W. Eliot, Cambridge,

represent the whole association, and that the scope of its work should not be confined to advocating a National Department of Health, but should include the prosecution of all suitable work for securing improved national health.

The committee adopted the policy of not attempting much direct work for improving health conditions, but rather of inducing other agencies, already existing and equipped, to do the work. It has aimed especially to enlist the services of three great agencies, the press, the insurance companies, and the government.

At the outset the committee was confronted with the fact that very little information exists concerning the health of the nation as a whole. Actual facts as to deaths are available in only half of the population. Of the remainder we do not even know how many deaths occur. Before the nation can intelligently do its part of the work of disease prevention, the national aspect of diseases,

Mass.; Rev. W. G. Eliot, Jr., Portland, Ore.; Dr. Livingston Farrand, New York City; Hon. Charles J. Faulkner, Washington, D. C.; Dr. Henry B. Favill, Chicago, Ill.; Dr. George J. Fisher, New York City; Prof. Irving Fisher, New Haven, Conn.; Horace Fletcher, New York City; Austen G. Fox, New York City; Lee K. Frankel, Ph.D., New York City; Dr. John S. Fulton, Washington, D. C.; President H. A. Garfield, Williamstown, Mass.; William R. George, Freeville, N. Y.; Prof. Franklin H. Giddings, New York City; E. R. L. Gould, New York City; Rev. Percy S. Grant, New York City; Dr. Luther H. Gulick, New York City; President A. T. Hadley, New Haven, Conn.; Norman Hapgood, New York City; Miss Hazard, Peace Dale, R. I.; Prof. C. R. Henderson, Chicago, Ill.; Mrs. John B. Henderson, Washington, D. C.; Calvin W. Hendrick, Baltimore, Md.; Byron W. Holt, New York City; Prof. L. Emmett Holt, New York City; Dr. J. N. Hurty, Indianapolis, Ind.; Rt. Rev. John Ireland, St. Paul, Minn.; Prof. M. E. Jaffa, Berkeley, Cal.; Prof. Jeremiah W. Jenks, Ithaca, N. Y.; Dr. P. M. Jones, San Francisco, Cal.; President David Starr Jordan, Stanford University, California; Prof. Edwin O. Jordan, Chicago, Ill.; Arthur P. Kellogg, New York City; Dr. J. H. Kellogg, Battle Creek, Mich.; Dr. S. A. Knopf, New York City; Dr. George M. Kober, Washington, D. C.; Dr. George F. Kunz, New York City; Prof. James Law, Ithaca, N. Y.; Samuel McCune Lindsay, New York City; Hon. Ben B. Lindsey, Denver, Col.; Dr. Jaques Loeb, Berkeley, Cal.; Hon. John D. Long, Boston, Mass.; S. S. McClure, New York City; Dr. J. N. McCormack, Bowling Green, Ky.; Hiram J. Messenger, Hartford, Conn.; John Mitchell, New York City; Hugh Moore, New York City; Dr. Prince A. Morrow, New York City; Dr. Richard C. Newton, Montclair, N. J.; Prof. M. V. O'Shea, Madison, Wis.; Walter H. Page, Garden City, L. I.; Henry Phipps, New York City; Dr. C. O. Probst, Columbus, Ohio; Dr. Charles A. L. Reed, Cincinnati, Ohio; Mrs. Ellen H. Richards, Boston, Mass.; Dr. R. A. Sargent, Cambridge, Mass.; William Jay Schleffelin, Ph.D., New York City; Prof. Henry R. Seager, New York City; Hon. George Shlras, III, Washington, D. C.; Dr. George H. Simmons, Chicago, Ill.; President William F. Slocum, Colorado Springs, Col.; Dr. Charles D. Smith, Portland, Me.; Dr. Z. T. Sowers, Washington, D. C.; James Sprunt, Wilmington, N. C.; Melville E. Stone, New York City; Nathan Straus, New York City; J. E. Sullivan, New York City; William H. Tolman, New York City; Dr. Henry P. Walcott, Boston, Mass.; Dr. William H. Welch, Baltimore, Md.; Prof. F. F. Westbrook, Minneapolis, Minn.; Talcott Williams, Philadelphia, Pa.; President, Robert S. Woodward, Washington, D. C.

as they spread over state boundaries, must be known. The lack of such knowledge has been an added incentive to the Committee of One Hundred to ask for a health department to gather national health information. Referring to a map which the government made at a great expense to show where the best beet crops might be expected, Dr. Wiley, chief of the bureau of chemistry, has commented on the dearth of national maps on more vital subjects. He says:

Our government needs maps of vital conditions throughout the country. We would have a map of the United States showing where the cancer belt is, where the greatest tuberculosis area is, where the typhoid area lies, what is the area containing men and women of the finest physiques. Such information would be of illimitable value to the nation in any intelligent attempt at the reduction of disease, and would save millions of dollars to the nation now lost by unnecessary sickness and unnecessary premature death.

Meanwhile the committee has availed itself of such material as exists on national health conditions, and has endeavored to place this material in the hands of as many people as possible. The object of the committee was two-fold: First, to give ground for a popular demand for a National Health Department; second, to set the people thinking on health subjects. As Dr. Wiley further says:

If we have never had a Department of Health, Congress is not at fault; it is the fault of the people of the United States. They are perfectly apathetic about their own health. They go about their work day after day, and then when a break in health comes, they submit to all its consequences with a kind of feeling that the disaster is inevitable.

An American Health League was started by the committee. The membership in the league soon numbered 25,000. To these people and to the press literature was sent on the prevention of sickness and the need of national action. In all the committee has issued over two-score publications, among them "National Vitality," the report by Professor Irving Fisher, president of the Committee of One Hundred, as a member of President Roosevelt's Conservation Commission. This report, which was commended by eminent scientists, showed that out of the entire population 1,500,000 die annually, and of this number nearly half (over 620,000) die many years before they should; that proper precautions would save those

years of life. It also showed that there are constantly 3,000,000 sickbeds in the country, and that if hygienic knowledge now available were used, at least one-half of these people might be among the well, instead of among the sick. But besides the knowledge which already exists in regard to the nature of diseases, Professor Fisher brings out in his report that much more knowledge is needed to explain the causes of many diseases. For obtaining such information and for spreading it among the people, a National Health Department would be effective.

This conservation report on "National Vitality," was printed in several large editions by the United States Senate, at the suggestion of Senator Robert L. Owen, who has actively championed the National Department of Health movement. Copies of the report were spread throughout the country, and have furnished a large part of the committee's educational campaign.

A magazine called "American Health," was published by the committee in the beginning of its work. After a few issues of this magazine, however, the committee succeeded in enlisting the direct co-operation of "McClure's Magazine," "World's Work," "The Survey," "The Dietetic and Hygienic Gazette," and "Good Health." When this was accomplished, the committee's own magazine was discontinued. Many other magazines have directly co-operated in the committee's work.

Since the results for which the committee is working are a matter of vital consequence to life insurance companies from a business standpoint, it was apparent to the committee from the beginning that such companies could be a powerful aid in accomplishing those results. At a meeting of the Association of Life Insurance Presidents, in February, 1909, Professor Irving Fisher read a paper on "The Economic Aspect of Lengthening Human Life." A "Human Life Extension Committee" was then appointed. Since this meeting, the life insurance companies have entered more actively into the health campaign. Health educational departments have been established in many of the companies, medical examinations have been increased, sanatoria have been built, and definite steps have been taken to aid in obtaining national action in behalf of health. The life insurance companies, therefore, are to-day among the most powerful agencies for the betterment of health in this country. In a recent paper on the subject, Professor Fisher



reviewed the progress which the insurance companies have made in health work. He said:

At present the movement has only just begun; although it has, I believe, gone far enough to demonstrate its wisdom. The Metropolitan has established a consumptive sanatorium in the face of much opposition and in spite of an adverse decision at first by the Insurance Commissioners of New York State as to their right to do so; it has engaged visiting nurses to co-operate with visiting nurses' associations in certain cities to care for its bed-ridden policyholders; it has established a health magazine to distribute health literature among its policyholders—which magazine is made available to 15,000,000 readers, or one-sixth of the population in the United States; and it has endorsed in several ways and on several occasions the movement for a National Department of Health.

The Provident Life Assurance Company has established a health bureau which performs two functions, one of issuing bulletins of health information among its policyholders, the other, of granting to those who choose, free medical examinations. At first these free examinations were to occur every two years, but the results were immediately found to be so satisfactory in holding off the Grim Reaper, who was creeping upon his victims unawares, that the interval for periodical examinations has been reduced to one year.

The New York Life Insurance Company has taken a hand in the effort to improve and purify the milk supply of New York City.

Mr. Robert L. Cox, counsel for the Association of Life Insurance Presidents, states that "practically all of the companies represented in the Association of Life Insurance Presidents are giving their moral support to the movement for the prolongation of human life. In addition, many of them are doing practical educative work. Measured by number of policies in force, the association companies cover seventy-eight per cent of the field of American companies, having 21,700,000 policies out of a total of about 28,000,000. The association companies engaging in individual work along health betterment lines have seventy-three per cent of the total number of policies in force, or 20,500,000.

There is another group of companies in the association which goes beyond the body of policyholders in its health promotion activities. They advise impaired applicants for insurance as to their physical condition and make suggestions to aid them. There are four companies in this group. Two of them, in the East, have a total of 86,000 policies. Another is a flourishing Middle West company that has about 150,000 policies. The fourth is a young and conservative Southern company with 7,200 policies.

One of the Connecticut companies has published suggestions as to health reform in its magazines to agents. Two other companies—one of Massachusetts and the other of California—are considering active work in the future.

The fraternal societies have entered the campaign. Their journal, the "Western Review" now has a department especially devoted to the public health. Fraternal insurance companies have also in several instances estab-



lished sanatoria, and have attempted in other ways to lengthen lives and decrease death claims.

The accident companies have, I understand, for some time, aided in getting state laws passed to prevent accidents to life and limb.

Finally, health insurance, one of the youngest forms of insurance, has made a beginning in the field of prevention. The Loyal Protective Insurance Company has, within the last few months, established a health bureau to issue bulletins and conduct a sort of correspondence school of health information. Considering the fact that few, if any, of the existing insurance companies have been engaged in health insurance for more than fourteen years, their present entrance into the field of prevention is unusually prompt. Personally I believe that in health and accident insurance—and especially in health insurance—there are gigantic possibilities of profit. I use the term profit rather than philanthropy in recognition of the fact that insurance companies as such have no business to undertake philanthropic work except when it is profitable. In the end the money gains made by the insurance companies by reducing mortality and invalidity will be shared by the public in reduced premiums.

In the matter of enlisting government aid, the committee has been active in several states. It has aided health legislation, notably the law in Connecticut for the "Sterilization of Degenerates."

The committee has also laid the foundations for national health legislation. In the beginning of its work, ex-President Cleveland sent a letter of endorsement. Then came the endorsements of Presidents Roosevelt and Taft, and of Mr. Bryan. Both political parties put national planks in their platforms. Many noted men endorsed the movement and worked in its behalf. The governors of most of the states expressed themselves as favoring the establishment of a National Health Bureau or Department. National societies favored the movement, and passed resolutions endorsing it. The Grange endorsed it. The United Mine Workers and other labor organizations endorsed it. Educational institutions, boards of health, civic associations, women's clubs—all heartily endorsed the committee's work. Boards of trade throughout the country took up the movement, recognizing that health plays an important part in the prosperity of a community. The country can now be said, therefore, to be awake to the need of national action for the suppression of disease.

The Honorable George Shiras, III, a member of the committee, made an exhaustive study of the question of constitutionality of a National Health Department, and reported favorably on it.

The first national bills of importance that came under the

consideration of the committee were Senate bills 6101 and 6102 and their equivalents in the House. These bills aimed to increase the salaries of officers in the Public Health and Marine Hospital Service, and to enlarge the scope of their work. The merits of the bills were given thorough investigation by the executive and the legislative sub-committees of the Committee of One Hundred. After due deliberation, the committee decided to withhold approval (except as to the increase in salaries), and submitted to the President its own plan for increasing the efficiency of the federal health service. Instead of enlarging the scope of the present Public Health and Marine Hospital Service, which might result in duplication of work already being done in other bureaus of the government, the committee recommended that all the federal health agencies be concentrated into one department, instead of being scattered, as they are now, in various departments.

The President then appointed a "Commission on the Organization of the Scientific Work of the Government." This commission consisted of Charles Walcott, chairman (director of the Smithsonian Institute), James R. Garfield, W. L. Capps, William Crozier and Gifford Pinchot. They confirmed the recommendations of the committee, stating that "there exists a lack of co-ordination and effectiveness [among the bureaus doing public health work] that can only be overcome by administrative supervision in one department."

In the fall of 1909 President Taft took up the subject of co-ordinating the existing federal health agencies, after having repeatedly favored the idea in his public utterances. He had various plans suggested for the improvement of the federal health service. These were submitted to the Committee of One Hundred, and expert opinions were obtained from outside sources. None of these plans, however, satisfied the President or the committee.

New health bills were introduced in Congress, until, during the session of 1910, there were no less than six public health bills to which the Committee of One Hundred gave consideration. One bill, introduced by Congressman Simons, aimed "to further protect the public health," imposing additional duties on the Public Health and Marine Hospital Service. Another bill, introduced by him, aimed to "establish a Department of Public Health," this department to be supervised by a director-general of public health appointed by the President, all divisions of the government work relating to

public health, except those in the War and Navy departments, to be combined in one department. Congressman Hanna introduced another bill "to establish a Department of Public Health." This provided for a secretary of health, who should have a seat in the Cabinet. Congressman Mann introduced the bill "providing for a public health service." This was the plan to change the name of the Public Health and Marine Hospital Service and to enlarge its scope. He also introduced another bill to establish a bureau of health within the Department of Commerce and Labor "to perform the functions now exercised by the Public Health and Marine Hospital Service and the division of foods and drugs of the bureau of chemistry." Senator Owen introduced a bill to establish a Department of Public Health under the head of a secretary who should be a member of the President's Cabinet. After giving due consideration to all of the bills, and to the subject of the advisability of drafting a bill of its own, the Committee of One Hundred decided to endorse the principle of the Owen bill, although not committing itself to its details.

The national health movement has been powerfully supported by many members of the House and the Senate. Upon taking a poll of Congress, the committee found that there exists predominating sentiment in favor of increasing the efficiency of the federal work concerned with conserving the human-life assets of the country.

One problem before the committee was the question of establishing a Department of Health instead of a bureau. The original aim of the committee was a department, but President Roosevelt was unwilling to enlarge the Cabinet by adding a Secretary of Health. In order to obtain the President's help, the committee withdrew its advocacy of a department, and asked for only a new bureau of health, to be placed within one of the present departments. This change was adopted, not because anything less than a department is needed to carry on properly the work of conserving the lives of 91,000,000 people, but as a step in the right direction.

When President Taft came into office, it was found that he was less opposed to enlarging the Cabinet. Upon the appearance of the Owen bill for a Department of Health, the committee decided to endorse the principle of the bill. In regard to this question of a department versus a bureau, Senator Owen says:

We have had bureaus affecting the public health for one hundred years. They are scattered in eight departments. They have been disconnected and without co-ordination. They have even been jealous of each other, the one nullifying and hampering the work of another. They have been without a responsible head because of this subdivision and because the chief of the most important of these bureaus, the Surgeon-General of the Public Health and Marine Hospital Service, can not express an opinion or give information until he has consulted the Secretary of the Treasury—a system that is absolutely ridiculous.

The Secretary of the Treasury was not selected as a Cabinet officer because of his knowledge of the public health, but because he was an expert on finance. At present our Cabinet expert on finance directs government activities in controlling bubonic plague, and the board of trade and a few commercialized physicians of San Francisco would be more important in his eyes in all human probability than the chief of one of his subordinate bureaus; at all events this was true as to a previous Secretary.

Senator Owen cites an instance when local commercial interests went over the head of the chief of a health bureau, as a consequence of which public health had to suffer.

Upon the appearance of Senator Owen's bill, and after the stirring speech which he made on this subject in the Senate, a new faction appeared. This sprang up suddenly, apparently with plenty of money at its command, and put in the newspapers paid advertisements, which contained misleading statements designed to convince readers that the Owen bill proposed to establish a department of healing, that only doctors of one school of medicine would be allowed to practice, and that the "medical freedom" of those of all other schools would be restricted. As there is no part in the plan for a National Department of Health, which seems to justify such a perverted view of the national health movement, the Committee of One Hundred has endeavored to look into the source of the opposition. The committee has found that it is aimed at the American Medical Association, which happens to be one of the many endorsers of the Department of Health idea. The American Medical Association has maintained a department for investigating the ingredients of certain patent medicines, making public the facts regarding the misrepresentations made in their behalf and the harmful results from using those that contained injurious drugs. Such a proceeding on the part of the American Medical Association has not only antagonized the patent medicine interests, but has antagonized those doctors who have been in the habit of prescribing such

medicines for their patients. The cry of these people for "medical freedom" has been caught up by a number of unsuspecting people, however. Some of the Christian Scientists, for instance, are said to be enlisted. Ignoring the fact that the real issue is whether or not the government shall take steps to prevent the needless sickness from which this country is now suffering, these people apparently accept the present amount of sickness as inevitable, and center their attention on who shall get the business of treating it. President Taft referred to these misrepresentations in his message to Congress in December, 1910. He said:

In my message of last year I recommended the creation of a bureau of health, in which should be embraced all those government agencies outside of the War and Navy departments which are now directed toward the preservation of public health or exercise functions germane to that subject. I renew this recommendation. I greatly regret that the agitation in favor of this bureau has aroused a counter agitation against its creation, on the ground that the establishment of such a bureau is to be in the interest of a particular school of medicine. It seems to me that this assumption is wholly unwarranted, and that those responsible for the government can be trusted to secure in the personnel of the bureau the appointment of representatives of all recognized schools of medicine, and in the management of the bureau entire freedom from narrow prejudice in this regard.

Meanwhile the country is interested in the facts regarding achievements in the *prevention* of sickness that have been made in different parts of the United States, and in Panama and the dependencies, by the adoption of sanitary measures.

Congressman Mann has now introduced in the House a bill to change the name of the Public Health and Marine Hospital Service to the Public Health Service, and to enlarge its scope. The committee has decided to oppose this bill, as being an avoidance of the demand for a consolidation of the health activities of the government. The committee is continuing its endeavors to unite the powers of the nation against the enemies of health, confident of the support of all who are guided by reason and humanity.



## PUBLIC HEALTH MOVEMENT ON THE PACIFIC COAST

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It is appreciated here, as elsewhere, that the great motive power back of this world-wide health movement is the discovery of the germ theory of disease through the efforts of our scientists, to whom the deepest gratitude is felt, and to whom the highest praise must be given. The proof of the appreciation of the work can be best expressed by spreading this new gospel. An eminent surgeon says, that more has been accomplished in the last thirty years than in thirty centuries before.

Chemistry, physiology, bacteriology, hygiene, sanitation, dietetics, psychology, philanthropy, jurisprudence, sociology and criminology are giving the required knowledge that only needs practical application to bring to humanity, health in its widest and truest sense, the health that enables man to develop the highest and best of which he is capable, in his physical, mental and moral nature. Undoubtedly the first great step has been the tuberculosis campaigns, which have stimulated greater activity in overcoming other diseases, especially those of an infectious nature. The tuberculosis associations have been active throughout the West.

A special interest was awakened in the State of Washington by the Tuberculosis and Public Health Exhibit at the Alaska-Yukon-Pacific Exposition, held in Seattle, in 1909. Enthusiastic local leagues were formed in many counties. There is an active state society. While Washington has an excellent law, providing for the reporting of cases, and for disinfection, this law has been a dead letter from the first; that is, for eleven years, for lack of funds. Strenuous efforts will be made at the present Legislature to procure an appropriation.

In Oregon, \$10,000 has been expended through the Visiting Nurses' Association in caring for indigent tuberculars. A state sanitarium, well equipped, accommodates 150 patients. The Penitentiary and Insane Asylum have separate outdoor pavilions for their tubercular inmates.

California has a state association, which also has been

greatly limited by lack of funds. Seventy-five per cent. of all the money reaching its treasury has been received from Los Angeles. The great problem in California is not of the native born, who acquire the disease, but the penniless consumptives who come in such advanced stages that cure is impossible. Fifty per cent. of the cases belong to this class. So acute did conditions become a few years ago that a conference of social workers, through the Associated Press, sent an appeal to Eastern organizations to refrain from sending their advanced and penniless cases. Many of the Southern California fruit ranches are largely colonized by consumptives, and many have been permanently cured. In Banning, 65 per cent. of the inhabitants have settled there on account of tuberculosis, either in themselves or their families. California has no public sanatoria for tuberculous cases, but allows a dollar a day for each patient to charitable institutions caring for its consumptives.

To Southern California belongs the credit of having established the first charitable sanatoria for consumptives—The Redland Settlement, at Redland; The Barlow Sanatorium, Los Angeles; The Stehman Sanatorium, of Pasadena.

At one of the insane hospitals a wire enclosed yard has been furnished for outdoor life for the inmates. So much is it appreciated that a mere suggestion that he will have to go indoors if he is boisterous or noisy, causes the patient to become docile and tractable. Large numbers of educational pamphlets in different languages have been distributed by the tuberculosis societies.

Through the San Francisco Association for the Study and Prevention of Tuberculosis, the supervisors have passed a most stringent law which places San Francisco unquestionably in the foremost rank so far as tuberculous legislation is concerned. Lectures have been given to unions, fraternal organizations, settlement workers, mother's clubs and in schools and churches. Thousands of circulars have been distributed at these lectures.

Tuberculosis clinics are held in several of the large cities on the coast. Tuberculosis exhibits by means of demonstration cars, lantern slides and moving pictures, have been most fruitful agents in educating the public, especially in California.

The increased demand for certified milk is a direct result

of this education. A rather unusual sign, "Do not spit here," is placed high upon the wall in the assessor's office in one of our large cities. Its position at once arrests the attention and creates a smile, for not even the most inveterate "spitter" would choose such a place, but it is an effective deterrent.

In the use of moving pictures many health subjects are illustrated; for example, the dangers of impure milk, of the fly evil, of the malarial mosquito and the bubonic flea. Apropos of the use of these novel films, this little jingle by Gertrude McKensie is transcribed:

"No more we'll seek the picture shows  
To drive away dull care,  
To see how Casey led the goat,  
Or watch the county fair;  
No more upon the screen we'll see  
How Wilbur Wright can fly—  
We'd rather watch the ptomaines jump,  
And see the germs waltz by.

"No more we'll seek the far North Pole  
With Peary or with Cook,  
Or scour the plains with Broncho Bill—  
We'll watch the hookworm hook.  
We'll no more laugh to see portrayed  
The pranks of little Willie—  
We'll watch the microbe do its stunts,  
And cheer the new bacilli."

California has several open-air schools for tuberculous children in Los Angeles, San Francisco and Oakland. Dr. N. K. Foster, the medical inspector of the Oakland schools, California, has furnished some interesting data, showing the average gain in weight of a class of tubercular children out-of-doors, and that of a class of the same grade indoors. Each child of the two classes was weighed at the beginning of the school term, and again at the end of the term, five months later. Comparison of the weights for the indoor class of normal children with those of the outdoor tubercular children showed an average gain for the tubercular child over that of the normal child of 1.37 pounds.

Despite the knowledge gained, of the value of fresh air and its application in the case of the tuberculous, there is the greatest disregard of its use as a prevention of disease. It really amounts to criminal negligence when one considers the poorly ventilated school-rooms, in which children are obliged to spend four or five hours a day. Scarcely a church, lecture hall, theater, railway

coach, or any indoor place where people congregate that does not soon become stuffy, close and oppressive. The hope of the future is in the child, and common justice demands that he should not be subject to the deleterious influences of impure air, dangerous at any period of life and especially to the growing child. Though insidious, it may prove as great a menace in undermining the system in the formative years of life as some of the dreaded infectious diseases of childhood. One would shrink with loathing and disgust from taking again into the body the waste from the intestinal canal or urinal tract, yet vitiated, polluted, poisonous exhalations from the lungs are constantly being rebreathed in poorly ventilated rooms.

A few years ago a prominent architect of large experience in California said that there was *one* perfectly ventilated building in the State, and that, a small bank in Woodland. In response to the query, whether the laws of mechanics had been applied successfully for satisfactory ventilation, he replied, "Yes, perfectly." In this bank the fresh air entering the building is forced to pass through a sheet of water, which removes impurities, and cools the air in summer, and warms it in winter. The expense of installing the ventilating system was \$5000. A few days ago the same architect was asked if the Woodland bank was still the only well-ventilated building in California. The reply was, "There are now many public buildings well equipped, some theaters, few churches, but no homes. Unfortunately, in many of the buildings provided with an adequate ventilating system the supervision is faulty, especially in the school buildings. The teacher, deeply absorbed in other matters, is the last one to have charge of the ventilating, and few janitors are equal to the responsibility. No engineer, no matter how perfect his machine, would think it could be run by one not trained. At first the expense of installing the ventilating plant was at fault, and now the expense of supervising and operating the plant is the cause of bad air in the school-rooms."

Perhaps no one has done more of late than the psychologist in discovering physical handicaps in his endeavor to determine the degree of mental deficiency in the backward child. The detection of physical defects, or deviations from the normal, in their incipency is not often permitted the physician, because his ad-

vice is rarely sought until defects resulting from disease have advanced so far as to be apparent to the laity. So at the same time that the public is being educated, the physician is stimulated to use every means available to obtain an early and correct diagnosis.

There is no work in the West comparable in its entirety to that being done in the University of Pennsylvania in the Psychological Clinic, under the direction of Dr. Lightner Witmer. One sees in this clinic the results, often most gratifying, of correcting defective sight or hearing or from removing impacted or diseased teeth, or adenoids and tonsils, and overcoming digestive disturbances; any one of these conditions, in different cases may reveal the tremendous influence of a physical disability, in arresting normal mental or moral development. Juvenile court judges, probation officers, and social workers, all begin to appreciate the deterrent and perverting effect of physical troubles upon the normal health of the child. Neither is there on the Pacific Coast, except in Los Angeles, anything that approaches the extraordinary "team work" done in Boston and Philadelphia, *i. e.*, the co-operation of specialists in medicine, oculists, aurists, neurologists and dentists, with the social workers, the probation officers and the public hospitals.

The state board of health of California has made gonorrhea and syphilis reportable, the same as other infectious diseases. It has the distinction of being the first State to inaugurate such a measure. When it is considered how many innocent ones suffer through this disease, it is appalling and too much cannot be said of the necessity of enlightenment to avert the evil in the future. It is certain that ignorance of the infectious nature of sexual diseases on the part of the growing young man and the false belief that his physical well-being requires sexual gratification, are the principal causes for his downfall. Grandin states it strongly, "Man, largely through ignorance of the calamities following the misuse of this, the reproductive instinct, has converted it into one for the extermination of the species." But by far the most potent agents in the continuance of the evil are the imperfect laws which license prostitution and require examination of the women prostitutes only, allowing men to go free. In view of the infectious nature of sexual diseases, ex-



termination of these diseases can never be expected, nor even lessened, with such laws. It is true, a recent remedy, 606, or Salvarsan, claims to cure syphilis. Whether this will counteract the fear of infection, remains to be seen. It is quite certain that, though there is a remedy for diphtheria and rabies, it is not considered a good reason for exposing oneself to these diseases.

Another source of danger to the young man, in encouraging sexual gratification, is the use of alcohol. Dr. Prince Morrow, of New York, who has studied the subject, says, "Perhaps, more than any other agency, alcohol relaxes the moral sense, while it stimulates the sexual impulse."

It is encouraging to note in this connection that in California 200 saloons were closed during 1910; that 68 precincts out of 74 voted "dry"; that there are 170 towns and 65 incorporated cities from which the traffic has been banished. Eleven counties are dry, and Los Angeles bars the saloon from 11 blocks in the business center. California is given the credit of having the most effective school law, passed in 1909, of any State, regarding health measures. An educator especially awake to the necessity for healthful conditions of the schoolroom, well says, "The schools furnish an unrivalled opportunity for detecting and checking disease and defects among children." It will be only a matter of a short time, it is hoped, before medical inspection will be in every school.

The bubonic plague, in California, the truth concerning which the daily press has falsely concealed from the public, has yet to be fought. In the light of present knowledge, its absolute eradication in the State depends upon extermination of the ground squirrel. Three hundred and eighty-five cases of plague-infected squirrels were found in the fiscal year ending June 30, 1910, in the Counties of Alameda, Contra Costa, Monterey, Merced, San Bonito, Santa Clara, Santa Cruz, Stanislaus and San Luis Obispo. There was a death of one human reported in June, 1910, due undoubtedly to infection by squirrel fleas. The origin of the epidemic in 1908 was supposed to be of foreign importation, now it is known that the infected squirrels were the cause. Federal officers are still watching the seaports, and the extermination of rats goes on. Oregon, fortunately, has never had an

invasion of bubonic plague, due probably to the fact that it has no easily accessible seaports, as in Washington and California. Washington has had no plague among men for over two years, and only one in rats, early in 1910. The work of destroying rats has been continued by the United States Public Health and Marine Hospital Service since the appearance of plague there in 1907. Washington profited by the disastrous experience of California in 1903, and, by energetic measures, promptly and effectively checked the outbreak. It, too, realizes the danger that may come to it through the infected ground squirrel of California. Besides bubonic plague, the other Oriental diseases, leprosy, trachoma, pellagra, beri-beri, amœbiasis and hookworm, are being carefully watched by the health authorities of the seaports. Cancer and poliomyelitis, miscalled infantile paralysis (for adults are also victims), the cause of which science has not yet discovered, continue their deadly work here, as elsewhere. California takes great satisfaction in the comparatively small number of deaths among infants from dysenteric and diarrhoeal troubles. The cool summers on the coast, and the absence of humidity in the interior, are the beneficent agents lessening these enteric diseases of children.

While the hygienic laboratories of the Pacific Coast are doing effective work, they are much handicapped for funds. The death rate from typhoid, based on the census of 1910, is 20 per 100,000 in California, approximately only two-thirds of the United States rate. Oregon and Washington are also as yet unable to control their water supply and disposal of sewage in rural districts, so that typhoid still continues its ravages, a woeful fact in this enlightened age.

The California State Health Bulletin, in the November number of 1910, considers the necessity of a compulsory sanitary privy law, or ordinance, to be strictly enforced in all localities in which connection with a sewer system is not enforced. There is also presented a plan for a sanitary privy, so clear in detail that any 14-year-old boy of average intelligence and mechanical ingenuity could build it. There follows minute directions for keeping it clean and how to dispose of the excreta, to prevent pollution of drinking water and vegetables eaten uncooked.

The playground movement has been enthusiastically taken

up in Washington and California. Oregon provides each school with 200 feet square of playground. The playgrounds are supervised by voluntary attendants, there being no salaried employees. California has the distinction of having the first state playground association. The object of the state association is to promote the playground movement, in all its phases, throughout the State, to promote outdoor life, to supervise plays and to co-operate with school authorities in a more spirited use of all the playgrounds. The University of California and the normal schools have established playground courses in their summer schools. The society seeks to establish a spirit of "free play, of fair play, and of more play"; and to educate the Commonwealth to the worth of stronger boys and girls.

In April, 1910, the State Board of Health called a conference of the welfare organizations of California to meet at Sacramento. The result of this meeting was the organization of the California Public Health League. Its purpose is stated in the constitution to be the co-ordination of effort, and the promotion of economy and harmony among all public health organizations and agencies in California, thus correlating the important work of the many organizations working to upbuild California's standards of health and happiness. The heartiness with which the league is accepted promises well for the ultimate working out of its purposes. The bulletins sent out by the State Board of Health of California deserve especial mention, because they show a decided step in advance in their scope and subject-matter.

This paper would not be complete without at least an enumeration of the welfare organizations not before mentioned, and which are strong allies in health-conservation work: State Charities Aid and Correction Organization; California Public Press; California League of Municipalities; California Teachers' Association; Women's Christian Temperance Union; Y. M. C. and Y. W. C. Associations; welfare committees of the State Federation of Labor; fraternal organizations; chambers of commerce; American Red Cross, California, chapters; the American Medical Association, through its public health education committee; Association of Collegiate Alumnae, through its certified milk fund and baby hygiene committee; California Congress of Mothers; and women's clubs.

## PROTECTING PUBLIC HEALTH IN PENNSYLVANIA

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BY SAMUEL G. DIXON, M.D., LL.D.,  
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The present State Department of Health of Pennsylvania was created in 1905, and legislation was enacted that year giving the department sufficiently broad and general powers to enable the Commissioner to fully enforce all necessary health regulations.

Three hundred thousand dollars were given the department for the two years 1905 and 1906. So rapidly did the work grow however, that in 1907 the legislature appropriated to the department two million dollars. Six hundred thousand of this was specifically set aside for the establishing of the State Sanatoria for Tuberculosis, and four hundred thousand for dispensaries for tuberculosis. Still the work continued to grow. People gave it their hearty support and in 1909 the unprecedented appropriation of two million dollars for tuberculosis and one million dollars for general health work, was given the State Department of Health.

Has this expenditure of public funds been a good investment for the taxpayers of Pennsylvania? To answer the question I can simply point out briefly what the State Department of Health has been doing since its creation, what results it has accomplished and the promise of fruition in the future for the seeds already sown.

The death rate in Pennsylvania fell from 16.5 in 1906, to 15.3 in 1909. That does not sound like a very big drop when recorded in that form. But when our more than seven million population is considered, it means a saving of 13,907 lives.

In four years the death rate from tuberculosis has fallen from 134 to 120 per hundred thousand of population. That means 1,000 lives a year saved to the commonwealth.

In 1906, 56.5 out of every 100,000 of our people died from typhoid fever. The close of the year 1907 saw this death rate cut down to 50.3; it dropped to 34.4 in 1908, and in 1909 to 23.9, cut down one-half in four years. Reckoned in the number of precious lives saved, this means that had the death rate of 1906 pre-

vailed in 1909, Pennsylvania would have paid in tribute to this disease, 2,363 more of her citizens.

And what of diphtheria, the terror of every mother, and the very messenger of death to the poverty-stricken mother who can not provide antitoxin for her sick child? The state in its beneficent charity and its wise effort to prevent the spread of disease, has driven back this foe. Twenty thousand seven hundred and ninety-four little children, stricken down with diphtheria, were in four years treated with the free antitoxin supplied by the Department of Health's 650 distributing stations. Without antitoxin 8,743 of these children, according to recorded mortality rates, would have died. As it was only 1,765 died. What more remarkable saving of precious life could be asked as a result of a wise state aid! Six thousand nine hundred and sixty-eight children rescued from early graves, conserved to Pennsylvania's resources. Moreover, free antitoxin was also given in 15,125 cases, mostly children who had been in contact with the disease. All but a very few of these were absolutely protected against diphtheria.

Four years ago Pennsylvania realized the fact that if tuberculosis was to be conquered the state campaign against it must be thoroughly organized and conducted on a comprehensive scale. To this end a million dollars was given the Department of Health for tuberculosis work for the two years ending May 31, 1910.

With the humble but praiseworthy state camp of twenty-eight patients at Mont Alto, conducted by the Forestry Commission as a nucleus, a model tuberculosis village was started on this sunlit plateau. The little camp has now grown to a splendidly equipped institution, accommodating eight hundred patients, with buildings now under construction that will raise the capacity to over twelve hundred. Up to date considerably over four thousand poor consumptives, in all stages of the disease, have been treated at Mont Alto.

The Mont Alto Sanatorium has six hundred and fifty acres of ground situated in a state forestry reservation of fifty-five thousand acres. The buildings are on a plateau of the Blue Mountains, sixteen hundred feet above sea level, swept by pine laden breezes. The cottages for the early and moderately advanced cases are designed to accommodate eight patients each. They are nearly square, measuring 27 x 24 feet, with a central hall 5 feet 8 inches



in width, which is enlarged in the center for heating and lavatory purposes. Ventilation is secured by direct-indirect steam heating. The loft is well ventilated to keep the patients' room cooler during the summer months. Two patients occupy each room, which is so arranged as to secure an ample supply of fresh air, with proper protection against storms. The cottages are so placed that each room will receive the maximum of the sun's rays during the day.

The patients rest during the day in ample pavilions, instead of porches to their cottages which would forbid the sun's rays. The dining room is a large, well-constructed building, originally built to accommodate 500, but permitting of extensions as needed. The infirmary for the accommodation of the incurable cases is beautifully situated in the pines, but apart from the other buildings. There are bath and toilet houses at convenient distances, and a sewage disposal plant. We are at present completing a number of new buildings at the sanatorium, including additional cottages, a modern dispensary, nurses' quarters, and a separate building for children. Here, in the pure air and glorious sunshine, Pennsylvania's consumptive poor, in all stages of the disease, are receiving the best care and treatment that it is possible to get anywhere.

Some weeks ago when our tuberculosis exhibit was being shown in Pittsburg, the attendants noticed a big, strong, husky fellow pointing out the features of the model Mont Alto buildings to the visitors. Upon inquiry he was found to be a former Mont Alto patient and the joy of life and restored health shone in his face. He was only a type of many another who has won his fight under the state's care. In many, of course, the disease had gone too far but they have been made comfortable and happy at the institution and at the same time have not been a source of infection to others in their homes.

Tucked within the forest and thus protected from the winter winds, but enjoying the full benefits of the high altitude, the new State Sanatorium for Tuberculosis, at Cresson, is being constructed by the State Department of Health, on the property given the commonwealth by Andrew Carnegie. It is so planned that four wings may be constructed, one at a time, as needed, utilizing the same central building. Each wing or ward will accommodate 160 patients, giving a total capacity of 640 for the finally completed institution. The first story of the entire structure is of sandstone found on the

property. The second story is of asbestos boards timbered, and the roof will be of asbestos shingles. The layout permits of the maximum amount of sunlight, with the wards so arranged as to accommodate the varying demand of advanced and incipient cases. The central building will provide a dining room, reception and examining room on the first floor and apartments for the doctors, nurses and help on the second floor.

Connecting the east and west wards with the central building are corridors that have enclosed basements through which the patients can walk to the dining room in stormy weather, and a first floor to be used for the open-air treatment. Here the patients may sit in their rest-chairs and enjoy the sunshine, and thus is overcome the necessity of porches that would block out the sun from the patients' rooms. Into this sun-corridor also the patient's bed can be wheeled. To economize by using the same foundation and roof for as much as possible, a second floor of each connecting corridor will accommodate twenty beds for hospital cases.

The sanatorium site, about 2,400 feet above the sea level, is sufficiently far from all industries to have pure air for the patients to breathe. The summers are cool and the winters long and unbroken.

At Hamburg, in Berks county, a site has been purchased for an eastern sanatorium, which will be built along the same lines as the one at Cresson. The site selected commands a pleasing view of wooded mountains, broken into gaps and peaks, with the Schuylkill River winding in the valley to the west. Far enough away to avoid all objection of noise and smoke, but near enough to relieve a sense of lonesomeness, the Schuylkill Valley branches of the Pennsylvania and Reading railroads are seen. The quaint town of Hamburg nestles in the valley below, bordered by fertile stretches of farm lands with their restful, pastoral scenes.

At these three state institutions, Mont Alto, Cresson and Hamburg, the poor will receive ideal treatment for tuberculosis. They will not suffer under the disadvantages of city hospitals, where their lungs would be constantly irritated by the smoke and dust so common to all large municipalities.

Hand in hand with the sanatorium work goes the dispensary treatment. At one hundred and fifteen places in Pennsylvania the State Department of Health has a free tuberculosis dispensary

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in charge of a trained physician, with necessary assistants and visiting nurses. Some idea of the amount of work being done by these dispensaries may be gathered from the fact that up to November 30, 1910, 38,289 patients had registered for examination and treatment.

I believe that the educational and sociological work alone that is being done by the state from these dispensaries, to prevent the spread of disease and to better the conditions of living among the poor, would amply justify all the money Pennsylvania has appropriated for its tuberculosis campaign.

When these dispensaries were first started we realized that if they were to be fully successful, we should first of all have to reach the indigent cases. We therefore solicited and received the hearty co-operation of civic clubs, churches, organized charity organizations, labor unions and the large employers of labor throughout the state. This co-operation has always continued, and the department appreciates its value.

When an applicant for dispensary treatment has been carefully examined by the physician in charge, and full information as to the history of the case, environment, occupation, etc., noted, he is carefully instructed as to what he must do to improve his own health and the absolute necessity of taking certain precautions to avoid infecting others. He is supplied with sputum cups and paper napkins, and if too poor to get regularly the proper nourishment, this is supplied to him either in the form of milk and eggs or milk and oil, the latter having proven a most efficient food.

A day or so after the new patient has been to the dispensary a trained nurse calls at the home. The squalor and disease-breeding conditions that the nurse so frequently finds present a task that would seem impossible. But the nurse is all courage. Bright and cheerful and a model of cleanliness herself, she is not afraid to roll up her sleeves and set the pace for getting the house in order. Windows are thrown open, and God's glorious sunshine is allowed to come in and run riot through the rooms, killing, as nothing else can do so well, the lurking germs of disease. What a difference is made in that home!

The tuberculosis patient is again thoroughly instructed in the precautions he must observe and the health rules he must follow, and each member of the family is similarly taught how to avoid

infection. The patient himself is especially advised to sleep with windows wide open, or, better still, to sleep out of doors. Helpful suggestions are offered as to how sleeping quarters can be made out of back porches, for instance, at a nominal expense. Then the nurse makes a quick study of the other conditions in the home. Perhaps she notices that the children are anemic, poorly nourished and improperly clad, not necessarily because the family is destitute, but because the little income that exists is not being put to best advantage. Here is an opportunity to teach the mother how both in selecting and cooking the food the greatest possible nutrition can be secured for the least amount of money.

So it is that our nurses are going to the homes of the poor throughout Pennsylvania, letting in the sunlight, teaching the life-giving principles of fresh air and proper food, changing filth and disorder to cleanliness and neatness, making these people their friends, and thus making them understand that the state is their friend. Can there possibly be any other result than that these people should be lifted up, or, better still, that they should be incited to climb up to a higher plane of living and morality? Thus they become better citizens, better producers, and the commonwealth is so much the healthier, wealthier and happier thereby. Do you wonder why I say this work alone is worth all the money that Pennsylvania is spending to fight tuberculosis?

In sixty-six counties of the state the department has a thoroughly trained medical inspector, assisted by a corps of township health officers. There are altogether seven hundred of the health officers distributed throughout the state. To them the physicians report all cases of communicable diseases, and the health officers promptly placard the premises and establish the necessary quarantine. Upon receiving notice from the physicians of the termination of the case, the health officer thoroughly disinfects the premises. As a proof of the results being obtained from educational work, it has been gratifying to note the constantly increased number of requests from householders to have their houses disinfected after cases of tuberculosis. The tuberculosis and general sanitary exhibit that the department has been sending through the state has been a big factor in teaching the people to keep themselves healthy. Especially fruitful have been the talks to the school

children, who have not only learned the lessons themselves, but carried the message of health to their homes.

In connection with this work of educating the people, I want to take this opportunity of referring to the splendid aid given us by the public press in general. Through it, we have been able from day to day and week to week to talk over these problems of better health and better living conditions with the home group around every fireside in the state.

The new sanitary code passed by the last legislature has already been productive of far more efficient health work in municipalities throughout Pennsylvania by establishing uniformity in the rules for the control of communicable diseases. The State Department of Health through its organized army of medical inspectors and health officers has kept guard against the spread of disease in the rural districts, and whenever necessary has aided local boards of health in battling with epidemics that threatened to get beyond control. By example and by helpful advice and instruction these local boards have been greatly benefited, and in many municipalities, where no sanitary precautions were being observed, boards of health have been organized and stimulated to do effective work for their respective communities.

The inspection of dairy farms by the department's health officers as a protection to the milk supply is a most necessary part of the state's sanitary work, and will be carried on with a thoroughness which only a well-organized and adequate force of inspectors can attain.

These health officers also for the past two years have been making regular inspections of the sanitary conditions of all schools in the rural districts, and the result has been a very marked improvement at such schools. The department has also started a system of medical inspection of the school children in the rural districts. This inspection is being made by skilled physicians. In view of the results already accomplished by medical inspection of schools in some of the larger cities and municipalities throughout the country, we are safe in saying that the standard of health of the children in the country schools in Pennsylvania will be raised materially by this work.

When, in 1905, a state law was passed to protect the waters of the state from pollution it seemed as if an almost hopeless task



was being undertaken. If the truth must be confessed there was nowhere a more flagrant example than Pennsylvania of the criminal poisoning of the people's drinking water by disease-laden sewage. Private individuals, corporations and municipalities, large and small, were equally guilty. All this has not yet been changed. That would be inconceivable. But almost unhopd-for progress has been made, and this because the law has been administered wisely and justly, and the people themselves have been taught to understand and appreciate the absolute necessity and the real economy of protecting their water supplies from pollution. Twenty-six thousand four hundred and sixty-six private sources of stream pollution have been abated by the department to date. Seventy-six modern sewage disposal plants have been either built or are in progress of construction, as approved by the state. Two hundred and forty-six other municipalities and private sewerage corporations are preparing plans to be submitted to the department that embrace sewage treatment as a condition upon which the further extension of their sewerage systems is granted. Seventy-nine modern water filtration plants have been approved by the state and are either already in operation or under construction.

Thousands of physicians throughout Pennsylvania are being constantly aided in diagnosing their cases by the examinations of pathological specimens sent by them to the State Department of Health laboratories. Important research work is being done by the state in these laboratories, work that is adding to the world's knowledge of preventive medicine.

More than once in the past four years the federal government has held up as a model, Pennsylvania's system for the collection of vital statistics, that phase of work that lies at the foundation of all successful sanitation.

Viewed, therefore, from every line of activity that it touches, the State Department of Health, I hope, commends itself to the loyal support of the people. Far reaching as the work has been it must go forward with increasing vigor. The people's battle for health must be won. And it will be won.

## HEALTH PROBLEMS OF THE INDIANS

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BY JOSEPH A. MURPHY, M.D.,  
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The various phases of the health problem among Indians, involve also the many varied conditions which constitute what is known as the Indian Problem as a whole, which has been so long before the American nation. It seems only to have been within recent years that the importance of considering the necessity for action looking toward the improvement of the health conditions among them has been realized. Sentiment ranging from the often expressed opinion that the only good Indian is a dead one, to the other extreme, has and should be changed to the saner realization that the conditions resulting in the Indian dead or diseased on account of contagious infections, are not only a menace to the race itself, but also to the health of the people of the states in which they live.

General statistics in regard to the prevalence of disease among Indians are either incomplete and far from accurate, or have not been compiled. General vital statistics are also inaccurate. It is only in those places where allotments are actually being assigned that statistics in regard to the population, births and deaths are reliable. The Navajo Indians, for instance, are scattered over a wide range or desert. Their births and deaths cannot be accurately obtained. Many other Indian children among the less advanced tribes are born and die far away from any physician or government employee.

Where there is lack of co-operation on the part of the Indian it can be readily seen that the occurrence of births or deaths and the causes of the latter will remain unknown. Physicians are not summoned to the great majority of cases, and even yet the medicine men in some tribes have a hold on the beliefs of the people and are given charge instead. With such chances for error in the general statistics, it is only where a special comprehensive investigation has been made that the real conditions can be determined. There is

then, primarily, a great need for investigation and study of the prevalence of disease among Indians, and need for more accurate registration of vital statistics, and for the registration of contagious and infectious diseases. It will only be through the knowledge gained in this way that conditions will be fully realized and intelligent action can be taken for their improvement.

The work of the Indian service physicians in the past has not been specifically directed toward the prevention of disease, but since special studies have shown that the morbidity and mortality from infectious disease is excessively high among Indians, it is evidently imperative that they must not only treat the ills which actually present themselves, but make persistent, systematic, rigid examinations and frequent thorough inspections of all the Indians under their charge for the purpose of detecting cases of contagious diseases, submitting them to treatment and checking them in the incipient stages, and in addition, correcting insanitary customs and conditions which are responsible. Invasion of the Indian home for the purpose of examination of unwilling or reluctant adults or children is a work that is not only frequently resented as unwarranted interference, but also frequently prevented. The gratuitous advice for the remedying of ailments, offered treatment of disease, and suggestions for the improvement of sanitary conditions in the homes are frequently either disregarded or refused. Treatment apparently accepted is seldom persisted in except among the most advanced tribes, and among these the practice of medicine is very similar to that among whites. This attitude on the part of the Indians, which is not unwarranted nor unreasonable, and one which would be assumed by white people under similar conditions, has greatly hindered the attempt to improve sanitary conditions, and in some localities has rendered even special investigations or special treatment incomplete and unsatisfactory.

According to the most accurate returns available the general birth rate among Indians for the fiscal year 1910 was 30.2 per thousand; the death rate 24.0 per thousand, 40.1 per cent of which was due to tuberculosis. The death rate per thousand due to tuberculosis was 10.4. These figures are probably more nearly correct than those of 1909, which are:

Birth rate per thousand, 30.6.

Death rate per thousand, 25.54.

Percentage of deaths due to tuberculosis, 30.25.

Death rate per thousand due to tuberculosis, 7.71.

If these figures were accurate they would indicate a great increase in mortality from tuberculosis during the year 1910, but this increase is apparent rather than real and is due to error in the return. Comparing the mortality among Indians with that of whites, the returns from the registration area of the United States for 1909 show a death rate of 15.0 per thousand of the population, 11.2 per cent of which was due to tuberculosis. The total mortality among Indians then is 60 per cent higher than that among whites, and the percentage due to tuberculosis 258 per cent higher, or over three times as great as the average mortality from the same cause among whites.

In addition to the great morbidity and mortality from tuberculosis, the Indians suffer to a very great extent from other contagious and infectious diseases as well as the parasitic infestations. One of the most common serious diseases is trachoma. Of 22,340 Indians examined during the year 1910, 6,124 cases of trachoma were found, a percentage of infection of 27.4 per cent. This disease exists in both the North and South, but seems more prevalent among the southern tribes.

Pneumonia is a very common disease, though not apparently more or less prevalent than among whites. Impetigo contagiosa is exceedingly common. It frequently complicates scabies, which is almost constant in many camps. The great frequency of suppurative tubercular glands and impetigo has given rise to a popular opinion that these ulcers are an indication of syphilis. While venereal diseases are present among certain tribes, they are probably not present in as large a proportion among a majority of the Indian tribes as they are among whites.

Measles is a very serious disease because of the large percentage of tubercular infection. As a sequel actively progressive tuberculosis frequently results in a rapid fatal termination. The same is true of pertussis. Digestive disturbances, due to the condition and quality of the food eaten, is not only responsible for a large mortality among Indian children and infants, but for great general morbidity at all ages. Scarlet fever and diphtheria are present to

about the same extent as among whites. Typhoid is not as prevalent as among those who live in more congested communities.

The most prevalent diseases to be considered are tuberculosis, trachoma, nutritional disorders and parasitic infestations. It is the condition of the Indian homes, their habits, customs of living and ignorance of sanitary requirements that are primarily at fault. In the North during the cold season individual families of a large number of the tribes live crowded together at night in one unventilated room. Tubercular cases spit on the floors and no attempt is made to prevent the entire home and its surroundings from becoming badly infected. The Indians eat from these infected floors, flies swarm on the food, and in the sputum. Blankets used as pallets on the floors become badly infected and extremely dirty. Excreta and household refuse are inadequately disposed of. Children brought up in such environments are necessarily constantly subjected to tubercular and other infection, and it is only the fact that the greater part of the day is spent in the open air that prevents a rapid advance and more frequent fatal termination of the diseases contracted. Poor, insufficient, badly prepared and improperly kept food of insufficient variety frequently adds to the factors which contribute to the breaking down of the resistance of the infected Indians. Infected food is also a frequent method of spread of disease. In the South the crowding conditions are largely the same. The conditions of filth, lack of ventilation and light (many houses being windowless), infected earth floors, absence of the attempt to segregate contagious cases or prevent in any way the spread of disease, results in the same high percentage of infection. Some tribes are exceptions to this general description, there being all gradations from those who live under practically the same conditions as the average white family, to those of extreme filth and insanitary environment and habits. Whole families become infected with trachoma from the intimate contact of the crowded home. Lack of attempt to obtain medical treatment finally results in permanent impairment of vision or even complete destruction of sight. Since cases of this sort are present in large numbers scattered widely all over the various reservations, it is not hard to conceive what a difficult task the service physician has to search out these cases and give adequate treatment, especially where they are not inclined to accept or appreciate it.



It is extremely important, however, that this work be attempted for the protection of the tribe as a whole.

It has been a matter of observation for many years that a certain proportion of the pupils at non-reservation and reservation boarding schools developed pulmonary tuberculosis and had to be returned to their homes. Sanitary conditions, cleanliness and nutrition were far better at these institutions than at the Indian homes, and it seemed that there must be some vital defect in the school methods. While there may have been sanitary defects in the school system contributing to this high morbidity, it is at present well recognized that many children come to the school with latent or partially arrested tubercular infection. The majority are vastly benefited by the improved nutrition and sanitary conditions, but the confinement of school life and strain, tension and fatigue induced by the requirements of rigid routine are enough to account for a sufficient breaking down of resistance of some to allow the extension of latent infection. An epidemic of measles passing through the school leaves the same fatal wake of cases. These facts have not been so well understood in the past, nor has the necessity been realized for a constant vigilance on the part of the physicians and school authorities to detect in its earliest manifestations any symptoms of pulmonary disease. Failure to do this has resulted frequently in a certain proportion of contagion and spread in the schools.

The solution of the problem of improving health conditions is being met along a number of separate lines. Systematic field inspections are being made by the medical supervisor and his field assistants. Local physicians are directed to systematize their medical inspections of the schools and reservation Indians with such thoroughness as to detect and place under treatment incipient disease. A new system of records for the recording and reporting of medical cases and the registration of infectious diseases, including tuberculosis and trachoma, has been introduced. This should insure more complete and more accurate statistics, and will indicate more precisely the need for work in special localities. As a result of more frequent and general medical inspection of schools and reservations, sanitary measures will be better enforced and local necessary reforms instituted.

It will only be through education that any real lasting results may be accomplished. The subject of tuberculosis is being studied from special text books by every pupil capable of understanding it, and additional improved modern books on hygiene have been placed in the school curriculum. Circulating sets of stereopticon slides, illustrating the method of spread of tuberculosis in Indian homes, and methods of its prevention and cure are being distributed to all the schools and agencies. A lecture illustrated by moving pictures showing the important phases of insanitary Indian customs, habits and conditions, and the methods of preventing the spread of the diseases common among Indians, is being sent to all schools and agencies throughout the country. Literature in regard to the cause, prevention and cure of tuberculosis will be distributed on the reservations among all Indians who can read. To effect radical changes, raising the standard of living among the older Indians, is a difficult undertaking, but the emphasis that is being placed on the subject of health and sanitation in the schools is bound to bring good results with the younger generation.

For the improvement of home conditions the field matrons have been placed under the direction of the Health Section of the Indian Office, and a special field supervisor placed in charge. For the purpose of increasing the efficiency of the field matron force in improving sanitary conditions in the homes, printed instructions will be furnished to all field employees directing and instructing them in the methods of correcting these conditions. The education of the government employees in direct contact with the Indians is as important a matter as the education of the Indians themselves, for the employees' influence cannot and will not be exerted along the desired lines unless the employees are properly directed. It will require considerable detailed instruction to make efficient sanitarians of employees who are not trained or specially educated for the work, but their assistance must be depended upon to help out the work of the physician.

The treatment of the diseased Indians is also a serious undertaking. In the schools, monthly weighing of pupils and regular physical examinations by the physicians is intended to sift out those who are infected or predisposed to disease. Screened porches attached to hospitals and dormitories are to be built for the open-air

treatment of such pupils as show pulmonary weakness. These porches have already been built in many places. If cases of pulmonary tuberculosis develop at the boarding schools, either they must be sent to their homes or to special sanatoria. These sanatoria are being started in various sections of the country.

Advanced cases of tuberculosis in the home are undoubtedly the nuclei for the spread of infection to many additional cases, and the problem of preventing this is a difficult one. Local camps could be used to care for these cases, but the Indians are frequently unwilling to submit to treatment. These camps are being established, but force cannot be used to compel attendance. Even the white race is not willing to submit to coercive measures of this character.

In addition to the special measures directed against tuberculosis, a campaign is in progress for the treatment of trachoma. Special expert physicians and nurses are being sent to all infected regions to operate upon the cases and instruct the local physicians how to treat the disease. As soon as this work is accomplished satisfactorily at one school or agency, it is left to the local physician and other territory visited. A special hospital for the treatment of trachoma was established at Phoenix, and service physicians nearby are being detailed for periods of one month each to assist at the hospital and receive clinical instruction from the specialist in charge. This general plan of work has been successful and has already resulted in a solution of the problem in many localities.

As allotments are rapidly being assigned, reservations opened up to settlement and the Indians becoming citizens of the state, the continuation of the work of improving the above outlined conditions will become a problem to be assumed by the state authorities instead of by the National Government.

## HEALTH PROBLEMS OF THE NEGROES

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BY JOHN A. KENNEY, M.D.,  
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It is gratifying to state that the Negroes are becoming very active in the crusade against preventable diseases. In many places, without quibbling over such academic questions as whether the Negro is dying as rapidly as some other people, or whether there is some racial inherency productive of its high mortality, or whether it is due to environment, the race is realizing that its death rate is high; that certain diseases are taking more than their fair toll of human life from its ranks, and that many of these diseases are preventable. With this realization, many Negroes have set to work to improve their living conditions and reduce mortality.

As might be expected, the medical profession was among the first to realize this and to seek for improvement. In the year 1895 the National Medical Association, composed of representative Negroes in the practice of medicine, dentistry and pharmacy, was organized in the city of Atlanta, with the object of improving the conditions of Negro professional men, and through them, helping to educate the masses along the line of better health and right living. The influence of this organization has been felt in most of the country east of the Mississippi river, from Boston in the North, to Atlanta in the South. At its annual sessions, one of the chief features has been at least one public session, for the benefit of the people, when subjects of popular interest are discussed in simple language. Among the topics thus presented are the following: The Cause, Prevention, and Treatment of Tuberculosis; Infant Mortality; The Proper Care and Feeding of Infants, etc.

That these discussions have been appreciated by the laity is attested by the fact that they have always been given in crowded halls, and we have every reason to believe that they have done good.

Before the organization of the National Medical Association, there were in existence few state and local medical societies among

the Negroes. Most of those that were in existence have affiliated with the National, and a great many others have been organized under its influence. At the present time, nearly every state having a sufficient number of Negro physicians has its medical society, and, aside from this, nearly all the cities and many of the large towns also have local societies; and almost without exception, to a variable degree, they are striving to help the Negro people attain to higher planes of living, and thus improve their health and reduce their death rate.

Early in the year 1910, the executive board of the National Medical Association appointed a commission to study tuberculosis, hookworm disease, and pellagra among the Negroes. These reports, though incomplete, furnished one of the interesting features of the last meeting of the association.

A few illustrations may be mentioned. In 1908 the Bay State Medical Society of Boston, Mass., began a series of public meetings. The first meeting was held Sunday, February 3, the general subject of "Hygiene" being discussed under the following heads: "Oral Hygiene," "Personal Hygiene," and "Practical Hygiene." In March, the general subject of "Water" was discussed as follows: "Contamination of Water," "Purification of Water," "Medicinal Uses of Water." In April, "Milk" was the general subject, and was discussed as follows: "Human Milk and Its Advantages," "Contamination of Milk," "Infant Feeding." In May the general subject of "Tuberculosis" was discussed as follows: First, "Past, Present and Future of Tuberculosis;" second, "Channels of Infection, and Early Symptoms;" third, "Efforts Being Made to Control the Disease."

These meetings were all well attended, and evinced a surprising amount of interest on the part of the people in all walks of life. Since that season the society has held many similar meetings in all the colored churches of the city. Similar meetings have been held by the North Jersey Medical Society. It is the policy of this society to hold four of these meetings each year.

At the last meeting of the Louisiana Medical, Dental and Pharmaceutical Association, one hundred dollars was appropriated by the society as a nucleus for the establishment of a tuberculosis hospital for the treatment of Negro patients. A committee has been appointed to formulate plans and secure a location. An Anti-



Tuberculosis League has been established by Negro physicians of Louisiana. Lectures on hygiene, sanitation, and tuberculosis are delivered by Negro physicians to schools, associations, and summer normals. A public health car has been put into service by the Louisiana State Board of Health, which is admirably equipped, for the purpose of traveling through the state, stopping at various towns and cities, where lectures are delivered on hygiene and sanitation.

The Alabama Medical, Dental and Pharmaceutical Association has for a number of years devoted especial attention to topics pertaining to the health and sanitary conditions of the people. At its meeting in Selma, in 1909, one evening session was devoted to the subject of tuberculosis, in one of the largest churches in the city, which was packed with an interested and appreciative audience.

The Lone Star Medical, Dental and Pharmaceutical Association of Texas holds annual meetings, and, aside from the purely professional aspects of these gatherings, especial attention is paid to health topics.

The Medico-Chirurgical Society of New York, for the past year has been teaching the people by means of lectures in the different churches, etc.

The Medico-Chirurgical Society of the District of Columbia, with a membership of seventy or eighty, devotes much of its attention to topics pertaining to the public health. An anti-tuberculosis league has been formed in the city of Washington, with a membership of about 2,000.

In addition to what the Negro physicians are doing in an organized way, a tremendous amount of work—a great deal of it unheard of outside of their immediate communities—is being done by individual physicians. Without doubt, the Negro physician is one of the most potent forces for the uplift of the race, and there seems to be a growing realization on his part of what his great responsibilities are in this regard. The great volume of his work is done in private, in his office consultations, on his daily rounds, in the churches, the secret orders, the Sunday schools, the Y. M. C. A.'s, and in a great many other gatherings, he uses his influence for the betterment of racial conditions, and at the same time for the good of the public, for it cannot be denied that whatever may

be done for the uplift of the Negro as a race, at the same time, helps the general public.

As an instance of the above, I might cite a few examples: Dr. A. A. Wyche, a Negro physician practicing in the city of Charlotte, N. C., was impressed with how little our young men knew about caring for their general health, and to that end began a course of Sunday afternoon lectures to boys and young men on different subjects pertaining to their welfare. He said, "It was surprising to know the good these talks have done. So many have come to me privately and expressed how much they have been helped by them." He is now preparing a series of lectures to be given to the young women. He is also giving lectures, once a week, to trained nurses, to the Ministers' Union, and the graded school teachers, upon hygiene and other medical subjects.

At Atlanta, the Fairhaven Infirmary is operated by six Negro physicians and is doing great service in offering shelter at very reasonable rates. The nurses from the nurse training department of Morris Brown College, are sent out to do charity work under the direction of physicians, and in that way carry relief to the homes of many who really need the care of a nurse, but could not pay for such services.

Dr. R. F. Boyd, of Nashville, Tenn., writes, "I have been deeply interested in this subject for a number of years. I am at present president of the Anti-tuberculosis League of Nashville, which holds bi-monthly meetings in the various churches, instructing the people as to the origin, prevention, and cure of 'The Great White Plague.' We have a committee that distributes sputum cups to those who are subject to the disease. The anti-spitting law has been so thoroughly taught that now most of the people obey it almost implicitly, and the amount of spitting on the floors, cars, and sidewalks, is very much reduced. Since we began this campaign many of our people are living in better houses, wear better clothes, and are more careful about the selection and preparation of their food. The churches, school houses, and public buildings are better ventilated and the mortality is lessened." In Lexington, the local Negro medical society frequently gives lectures on health topics, to help educate the people in the prevention, as well as treatment of disease, and special effort is made to decrease the mortality from tuberculosis.

Some of the Negro insurance companies are alive to the issue, and are taking steps to benefit the health and prolong the lives of their policy holders. The North Carolina Mutual and Provident Association, of Durham, N. C., through Dr. A. M. Moore, its medical director, advises that "The most potent method is the bedside instruction given by agents and superintendents while paying sick claims. This comes at a time when one is more inclined to receive instruction. Through our annual agents' conference, I give a daily lecture on sanitation, contagions, and preventable diseases, and explain the danger of flies and water supply, as well as buying second-hand bedding, carpets or clothes; moving into houses in which contagious sickness has been prior, especially tuberculosis cases. We try to make every agent a sanitary officer. We issue a quarterly bulletin which is an advertising chart, one page of which is devoted to 'Sanitation and Health Hints.'

"I have succeeded in having several district physicians' societies organized, which meet in different cities, holding public meetings on sanitation, hygiene, and contagious diseases. We are constantly urging the agents, by circular letters and talks, to strive in every way to better the condition of the people in as many ways as possible."

The Union Mutual Aid Association, of Mobile, Ala., distributes through its agents, from time to time, helpful literature. Health talks are given to the agents by physicians. The agents are required, as cause and opportunity present, to speak to the policy holders on improving their sanitary surroundings.

The Union Mutual Aid Association is inaugurating this year the plan of giving small sums of money to the health department of a number of municipalities of the state, to be applied to sanitary improvement. It is not expected that the fund presented will accomplish very much, but it will help to wake the colored people up to the fact that some of the more thoughtful of the race are alive to the necessity of making tangible effort along this line. The company is planning at some time in the future to give one yearly medical examination to its policy holders at any time the policy holder, in good standing, may elect to take the same.

The Hampton Normal and Agricultural Institute, Hampton, Va., is doing good work at its annual conferences, by bringing together race leaders and teachers, physicians, etc., and among other

subjects discussing the health conditions among the Negroes. At the 1909 conference the Anti-tuberculosis League of Virginia was organized. In Elizabeth City county they are trying to teach the people that consumption is curable if taken in hand in time, and to apply to an intelligent physician for treatment, instead of going to the druggist or taking patent medicines.

Great efforts are being made in Norfolk to prevent the spread of consumption. Some four years ago the Anti-tuberculosis League opened a free clinic for the treatment of consumption; three days in the week being devoted to colored patients, and for the year ending September 30, 1909, sixty-four colored patients were treated at this clinic. "These patients were supplied with sputum cups, medicine, and printed instructions as to how to take care of themselves and protect themselves from infection, thus aiding in their own cure and protecting others from becoming victims of the disease." In October, 1909, a tuberculosis clinic was opened in the city of Norfolk for the colored people, with a trained nurse in charge, and seven colored physicians on the clinic staff in charge of the work. The city paid the salary of the nurses and expenses of the clinic; the physicians volunteered their services. From October 1, 1909, to June 1, 1910, one hundred and three patients were treated at this clinic. The nurse was required to follow up the patients who attended the clinics and give them instructions in their houses. One thousand six hundred and eighty-five such visits were made during the past year.

An Anti-tuberculosis League was organized in Portsmouth, Va., April 30, 1909. On October 19, 1909, the Richmond branch of the colored Anti-tuberculosis League was organized. This league has held a series of public meetings at churches. The third Sunday in January, 1910, was observed as tuberculosis day. A sermon on tuberculosis was preached in nearly every colored church in Richmond, and literature bearing on the subject was distributed. The visiting committee of the league, with Miss Mary F. Clark, a registered nurse, as chairman, did very important work by affiliating with the city health authorities in hunting up tubercular patients and providing proper treatment. The committee divided the city into districts and nurses were assigned to each district. Food, clothing, medicine, and even fuel have been furnished for the sick. Persons have been taught how to care for the sick, and how to

clean and care for their houses, and in some instances cooking lessons were given, and in many other ways this committee has helped along the work. The membership of the league is about four hundred.

Another element in the work of improving the health of the Negroes is the rise of the Negro hospitals. Dr. George W. Hubbard, dean of Meharry Medical College, reports that the graduates of Meharry own and control six institutions of this kind in Tennessee, two in Oklahoma, five in Texas, and one each in Missouri, Colorado and Georgia. These hospitals and sanatoriums have been well patronized, and have proven financially successful and have done much to prevent the sufferings of the colored people. Space will not permit me to do more than barely mention the names of a great many others, which are either owned or controlled by Negroes: Provident Hospital, Chicago; Freedman's Hospital, Washington; The Frederick Douglass Memorial Hospital, Philadelphia; The Plymouth Hospital in Boston; the Provident Hospital in St. Louis; the Provident Hospital in Baltimore, Md.; the Mercy Hospital, Philadelphia; the Richmond Hospital, and the Woman's Central League Hospital in Richmond, Va.; the Lincoln Hospital at Durham, N. C.; the St. Agnes Hospital, and the Shaw University Hospital at Raleigh; the Hospital and Nurse Training School at Charleston, S. C.; the Charity Hospital at Savannah, Ga.; the McVicar Hospital at Spellman Seminary, Atlanta; the Fairhaven Infirmary, Atlanta; the Lamar Hospital, Augusta; the Burrus Sanatorium, Augusta; the Tuskegee Institute Hospital, Tuskegee Institute, Ala.; the Hale Infirmary, Montgomery; the Northcross Sanatorium, Montgomery; the Cottage Home Infirmary, Decatur; the Old Folks' Home and Hospital, Birmingham; the Burwell Sanitarium, Selma; the Harris Infirmary, Mobile; the Kenniebrew Sanatorium, in Jacksonville, Ill.; the Red Cross Sanatorium, Louisville, Ky.; the Burt Sanatorium, Clarksville, Tenn. and the Perry Sanatorium, Kansas City, Mo.

Along with the establishment of Negro hospitals have arisen the nurses' training schools. Most of the hospitals mentioned above have connected with them such schools, which are sending out from year to year, a large number of colored women, who are not only getting ready employment among the white people but are



taking their share of the burden of spreading the gospel of good health and right living among Negroes.

The Associated Charities of Birmingham, Ala., employs a colored nurse to do settlement work, and furnishes medical attention without charge where needed.

Under the supervision of the Visiting Nurses' Association, of Chicago, there are four of the graduate nurses of Provident Hospital working among the Negroes, also one graduate of this hospital is a member of the school nurses' force. Her work is in the school, where a large per cent of the pupils are Negroes. In all probability, in the near future, another Negro nurse will be added to the tuberculosis nurse force. A tuberculosis dispensary is about to be established in connection with Provident Hospital.

From the third annual report of the Chicago Tuberculosis Institute, 1908, we quote, "Early in February a mass meeting of colored people was held in Fulton Hall. The result of this meeting was the formation of a strong Negro committee, which has done active work during the year, and among other things arranged for a dozen or more Sunday services at the different colored churches in the city, with sermons on tuberculosis."

Dr. Anna R. Cooper, a colored physician, is the leader of a movement to establish the Paul Lawrence Dunbar Sanitarium for the treatment of tuberculosis among Negroes. "Governor Hadley, of Missouri, has recently appointed an important tuberculosis commission. The object of the commission is to find out just what the sanitary conditions are among the Negroes." The Municipal Health Leagues were recently formed by both the white and colored people of Raleigh, N. C.

At Asheville, N. C., in both colored and white schools, the modern health drinking faucets have been established, and other improvements in sanitation have been installed.

Much is being done to improve the conditions in Savannah, Ga. The Men's Sunday Club, colored, of that city was organized in 1905. It has had an average attendance since organization of two hundred people. About every colored physician in the city has spoken before the club. In the summer of 1905 a regular campaign for health improvement was carried on. All the colored churches were visited and addresses made at each one by physicians

and others. Mothers' clubs were organized especially to assist in improving health conditions.

The colored Knights of Pythias are helping to restore to health a great many people, by having established, in 1908, at Hot Springs, Ark., a bath house and sanitarium, where thousands of colored people have gone and received benefit by the scientific application of the waters.

The Tuskegee Institute has been alive to this movement, and in numerous ways has attempted to improve conditions in the school, in the surrounding communities and in other places. Several forces have co-operated along this line.

The American tuberculosis exhibition, under the direction of Mr. E. G. Routzahn, paid a visit to the Institute in December, 1908, remaining several days, giving stereopticon lectures, health talks, as well as displaying the exhibit to thousands of visitors, including those connected with the school, the town of Tuskegee and the surrounding community. At the same time a Tuberculosis Congress was held, where important subjects concerning tuberculosis and the health of the Negro were discussed.

At the annual Negro conference of 1909 the subject, "General Health Conditions of Negroes in the Southern States," was discussed under the following headings:

"How the ministers can assist in bringing about better health conditions;" "What the teacher can do to improve our health conditions;" "How the doctor can assist in improving our general health conditions;" "Food and its relations to health."

The late Dr. S. P. Lloyd, of Savannah, Ga., led the discussion with a paper on health conditions from the physician's standpoint. He gave as the general causes of the high death rate among the Negroes poor housing conditions, bad landlords, dissipation, ignorance. He advocated improving these conditions by general education, by public instruction through the newspapers, physicians and ministers; that the municipalities ought to see that better houses are built for the Negroes. He also advocated the systematic and permanent co-operation of the Negroes themselves.

Bishop Alstork told how the church could help. During the discussion individual communion cups were advocated, also that lodges should hold shorter sessions; that churches should not be swept out Sunday mornings just before services.

The Tuskegee Institute has also assisted in this work by the publication of bulletins of health, under the direction of the resident physician. These topics have included, "Tuberculosis," "Typhoid Fever," "The Danger of Flies," and other topics along sanitary lines. Stereopticon lectures on tuberculosis, general sanitation, and the hookworm disease have been given, and other health talks to students and teachers in the school; also to the Macon County Farmers' Institute, the Macon County Teachers' Institute, and to some of the Negro churches.

Four years ago, in connection with the hospital, there was inaugurated among the women, what is known as the Hospital Aid Society, composed of an advisory board of ten women and members at large, from the school and community. This society has done a great deal to help improve conditions at the Institute Hospital; to make patients and nurses more comfortable; to visit the sick in the community; in many instances furnishing medical attention and nurse's services, as well as nourishment and medicine for those too poor to pay for these necessities. It also maintains a charity room and bed at the Institute Hospital in which suitable indigent patients are taken for operative and other treatment free of charge. At the last general meeting of this society it was interesting to hear some of these poor patients tell with gratitude how they have been helped.

Quite recently all of the school children attending the children's house, about two hundred, were examined by the resident physician and his assistants. A great many defects were found, parents were advised of the same, and directed to physicians, dentists and specialists, as the condition required, in order that the defects might be remedied.

The colored women's clubs are working to improve the homes through reading circles, by teaching domestic science, and by other means. Some of the clubs are conducting homes for aged men and women, and for boys and girls. The Boys' Reformatory at Mount Meigs, Ala., where thirty-seven boys and two men are cared for, on land that cost five hundred dollars, with a building costing twelve hundred dollars, is an example.

The Women's Club of Tuskegee Institute is especially active. Houses are visited with a view to teaching the people the simple principles of hygiene. The smallest details are looked after, as how

to prepare and serve their food, how and when to bathe, how to ventilate their houses, how to care for their hair, the washing of their clothing, cleaning their teeth, sleeping between sheets, and all such subjects as tend to improve their home conditions. The special subjects of tuberculosis and typhoid fever have been discussed before the people in the most elementary manner possible. Mrs. Booker T. Washington says, "The people themselves are most responsive and co-operative, and that as a result of the work which has been done along these lines, great improvements have been made."

PART TWO

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*Disease Carriers—The Control of  
Causes*





## THE RURAL HEALTH MOVEMENT.

BY CH. WARDELL STILES, PH.D.,

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*Rural and Urban Health.*—In the popular conception, rural life is more healthful than urban, and people have considerable to say about the “pure fresh country air.” Unfortunately, however, fresh air is only one of the factors necessary for health, and by itself “fresh air” will not overcome our great national sanitary crime of “soil pollution.” In plain unvarnished Anglo-Saxon, “fresh air” will not make up for the absence of a privy on 55.3 per cent. of the 4,822 American farm homes, in about 200 different localities, of which I have records.

In rural districts, medical attention is not as a rule so easily available as in cities, partly because of the long distances, partly because of poor roads, partly for other reasons, and in general the same standard of medical attention is relatively more expensive; free clinics are practically unknown, district nursing almost unheard of and hospital advantages rare, as compared with these advantages in the cities. Further, while the urban inhabitants receive more or less protection on the part of local boards of health, the inhabitants of the open country scarcely know what a health officer is, except in case of an outbreak of smallpox. In the city, the average American woman has the services of a physician in case of child-birth; in the rural districts the average American woman, so far as I have been able to learn, is not protected by medical attention at such time.

*Origin of the Present Movement.*—For more than two decades past, the American government has shown a keen interest in the health of the farmers’ swine, but it remained for ex-President Roosevelt to initiate a more active interest in the health of the farmers’ wives and children. Roosevelt’s Commission on Country Life was in fact the real starting point of the present nation-wide active movement for a betterment of health conditions in our open country. Naturally there was certain preliminary work in this line in various places, especially by some of the state boards of health, and there

were certain investigations into rural medical conditions, especially by the boards of health of Georgia and Florida, and by the Department of Agriculture, the Bureau of Labor, and the Public Health and Marine-Hospital Service. But it was President Roosevelt's Commission on Country Life, despite the ridicule heaped upon it by part of the daily press, that opened the eyes of persons in many states interested in agriculture to the self-evident fact that the life of the wife of the poorer farmer is not what it is so often thought to be and that her health is more important than that of the swine. Among the many indirect results of the work of the Country Life Commission must be included the tremendously increased activity on the part of at least nine state boards of health.

*Status of Rural Sanitation.*—If any one wishes to see how far behind the present status of sanitary science this country really is, he should visit a number of small farms and note under what condition the milk is kept; he should examine the toilet facilities and see how the flies infect the "fresh country milk" with human feces; how poor the ventilation is; how, for instance, the death rate from tuberculosis would be even greater than it is at present, were it not that some fresh air does enter the house because of cracks between the boards.

These conditions are not typical for any one particular part of the country and for that section alone, although they are accentuated in localities with more than one race, as in those sections where the Chinaman, the Indian, the Japanese, the Mexican, and the Negro are found in numbers. It is popularly supposed that one must go to the mountains of North Carolina to find really wretched sanitary conditions; but this popular idea was shattered to atoms by the Commission on Country Life as it brought out the facts of the unsanitary conditions of the so-called "bunk-houses" on some of the California fruit ranches, or of some of the conditions just this side of the Canadian border, or in Illinois, or in Nebraska and Iowa, and of the miserable hovels of the Mexican "Greaser." Any sanitary missionary in any part of the country can find enough to keep him busy for some time if he undertakes to improve the sanitary conditions of the farms within a radius of ten miles of his home—the farms which are supplying his table with milk, butter, berries, celery, lettuce, and with these, human excreta. That the conditions in

question are not present on some of the large and rich estates is to be admitted. That they are present and the rule on the poorer and even on the average farm can not be truthfully denied. In fact, the sanitary crimes, especially the great crime of soil pollution, are so flagrant that to the practiced eye they are often recognizable even from the window of a car as the train passes through a given district. Soil pollution is evident between New Haven and Boston; near Lake Sunapee; it extends across to the Pacific, down to lower California, eastward to Florida, northward to Maine; but it increases in degree and danger as soon as the population becomes mixed, and as the warmer climates are approached.

In some states, the sanitation surrounding the rural schools is, relatively speaking, excellent, but in many of our states rural school sanitation is a disgrace to our land. The church sanitation is usually, so far as my observations go, very, very far inferior to that of the public schools and indicates that the average rural clergyman has forgotten the advice given in Deut. 23. 12-13.

*Result of Rural Insanitary Conditions.*—Typhoid fever is a typical filth disease. Any person who contracts typhoid has recently swallowed some germs from the urine or feces of some other person. Flies are typically filth animals, as they breed and feed in and on filth, notably horse and human excreta. Let any one think how common flies are in the average American dining room and kitchen and he can form some slight conception of the coprophagous habit of the American nation. In the cities, the sewer system decreases both the number and the danger of flies; in the rural districts, where the sewer is replaced by the privy, which is rarely cleaned, and where almost every house is near a manure pile, flies abound, water is in general more of a luxury, coprophagy, unintentional of course, naturally increases, and with this there is an increase of filth diseases, such as typhoid; further, there is likely to be an increase in all soil pollution diseases, such as amebic dysentery, Cochin China diarrhea, hookworm diseases, etc. The personal habits of the average farmer are not so clean as those of the urbanite; spitting is general, chewing and snuff taking common, especially in certain districts, and as a result when, as is more common than popularly supposed, a case of tuberculosis occurs in the family the disease is likely to spread rapidly.

*Conservatism of Rural Population.*—The conservatism of the rural population is proverbial. It need not therefore be expected that conditions will be changed in a day. In fact, it will take at least a generation to bring rural sanitation to where it should be. The American farmer, at least in my experience, is not abnormally concerned about the health of his wife and children, whatever may be his solicitude for the health of his mares, cows, and sows. The farmer's wife, however, is deeply interested in the health of her children, and it is chiefly through the wife and children that a change in the present, often medieval, conditions will be brought about.

*Plan of Campaign.*—The most striking point in regard to the present campaign for improvement in rural conditions is the way the health officers and the school teachers have made friends and are working together. Of 77,127 answers to the question "Are the sanitary conditions on the farms in your locality satisfactory?" those from the school teachers came nearest to the real conditions as evidenced by the typhoid death rate. The present miserable sanitary conditions of the school houses are not due to the teachers but to the school boards. The rural school teachers are teaching sanitation in plain English and are eager to learn more that they may impart to the rising generation, and when, say fifty years from now, the history of the present movement for improved rural sanitation is written, there are certain persons who will be generally recognized as the people who made it possible, who launched it, and who carried it out. Were I to prophesy who would be mentioned in this connection I would say: Theodore Roosevelt, John D. Rockefeller, Walter Wyman, the field men of the various boards of health, and the rural school teachers.

*A Great Need.*—Aside from the factors at work in various parts of the country, looking to better rural sanitation in general, there are a few, *very, very* few, rural district nurses, and a few Y. M. C. A. rural secretaries who are doing work of a more special nature, the former helping the mothers and girls, the latter helping the men. Both of these movements are really in their infancy, but they both deserve the greatest good will and encouragement on the part of all people. The influence for good of a sensible rural "district nurse" is enough to make any person wish he were a millionaire for the one purpose of endowing this movement, one of the newest welfare policies.



## SANITATION IN RURAL COMMUNITIES

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BY CHARLES E. NORTH, M.D.,  
New York.

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Sanitation is man's best defense against his surroundings. Disease and death have become recognized as due not only to inherited weaknesses of the individual, but in a large measure to the influence of the external world upon him. This outer world is the medium which contributes the bacteria of infectious disease. One after another the diseases in the list of causes of death have been discovered to be due to bacteria which invade the human body and destroy it by the growth of their colonies and the formation of poisonous products.

Public interest has followed the lead of the scientific investigators. Under the name of sanitary science the fight against these poisonous plants, so-called bacteria, is being carried on. By sanitation the numerous avenues by which the bacteria are accustomed to travel to produce their outbreaks of disease are being closed up, their resting places are being destroyed, and the original sources of infection are being discovered.

The principles involved in the sanitation of rural communities differ in no respect from those of sanitary science in general. The gathering together of men into large cities or small towns or isolated dwellings modifies only the method of applying these principles.

### *Rural Population*

In the year 1790 the population of the United States was about four million persons of which 96.7 per cent lived in a rural state and 3.3 per cent lived in cities. In the year 1900, with a population of about eighty million, there was 66.9 per cent living in rural districts and 33.1 per cent in cities. These figures may be one reason for the often repeated statement that the farm is being deserted and the people flocking to the cities. There is certainly no doubt that some of the farming districts in the eastern part of the country, particularly in New England, are suffering from depopulation;

but on the other hand it is equally certain that in the middle and western part of the country the rural districts are becoming more thickly settled. The rural situation appears more plainly if the figures are tabulated as follows:

Year.	Population.	Urban.	Rural.
1790	4,000,000	132,000	3,868,000
1900	80,000,000	26,480,000	53,520,000

Thus, while the number of persons living in cities is relatively larger than during the century past, the rural communities have received an actual addition of over fifty million inhabitants while the cities have increased by twenty-six millions, or by one half the number.

#### *Absence of Official Supervision of Rural Sanitation*

The mere fact that country life is more natural to man and that he is by nature an outdoor animal, tends in some respects to make him revert toward the savage mode of existence, while sojourning in the country. The more ignorant and untrained he is, the more is this likely to be true. In the city he is a part of a civilized community and subject to its laws and customs. In the country, on the other hand, he is chiefly a law unto himself.

Among the institutions established for better administration of city life is the city department of health, whose function is the enforcement of rules and regulations controlling the character of buildings in which the people live, the protection of their foods and drinks against transmissible diseases, the proper removal of all household wastes, and the care of the sick, and especially of those suffering from transmissible disease. In large cities this control is comparatively rigid and efficient. In smaller towns it is much less so, while in rural communities it is still less. Thus, in a large city public authorities define the number of windows and the amount of ventilation required for dwellings. The water supply, the sewerage system, the garbage and ash removal are all in charge of public officers. Milk, meat, vegetables, fruits and all other foods are inspected and under the control of the health authorities. Hospitals and sanitariums are established for the sick and for the quarantining of contagious diseases. In rural districts, on the other hand, each man's home is as he may desire to make it. His water

and sewerage system, his method of disposal of waste, his milk and food supplies are all under his own personal control. Public authorities do not interfere with him in his management of such matters. The quarantining of infectious diseases is usually the only function performed by his town or county health officers, to protect him from preventable diseases.

### *Death Rates—Rural vs. Urban*

In the year 1908, seventeen states in the Union gathered records of the deaths occurring within their boundaries. These included all of the New England states, the Middle Atlantic states with the exception of Delaware, four states in the middle West, and three in the extreme West. None of the Southern states furnished any reliable statistics and the greater part of the middle and western states are also lacking in this respect. Consequently the statistics received concerned chiefly the northeastern part of the country, and for this reason the reports must be accepted with some reservation. When the great Negro population in the South and the large agricultural districts of the middle and western part of the country are included, the figures will without doubt be considerably modified. A partial list of the deaths occurring in the registration area, in cities and in rural communities is as follows:

Disease.	Deaths per 100,000.	
	Cities.	Rural.
All causes .....	1,654.6	1,396.0
Typhoid .....	24.5	24.3
Malaria .....	1.1	1.7
Smallpox .....	0.1	0.2
Measles .....	13.5	8.2
Scarlet fever .....	17.4	8.0
Whooping cough .....	10.4	11.9
Diphtheria and croup .....	27.9	17.3
Influenza .....	16.8	27.9
All other epidemic diseases....	10.6	13.3
Tuberculosis of the lungs.....	169.1	117.3
All other forms of tuberculosis..	29.2	19.3
Cancer .....	80.5	68.0
Tumor .....	1.1	0.9
Diabetes .....	15.1	13.6
Meningitis .....	21.4	17.1
Other nervous diseases.....	131.6	153.2
Diseases circulatory system ....	190.4	175.1

Disease.	Deaths per 100,000.	
	Cities.	Rural.
Pneumonia .....	107.8	82.9
Other respiratory diseases.....	103.3	61.9
Diarrhea and enteritis.....	133.5	96.9
Other diseases digestive system.	85.8	74.3
Bright's disease and nephritis...	113.9	73.7
Infancy .....	84.3	58.9
Suicide .....	20.4	14.4
Accident .....	96.8	101.0
Ill defined .....	26.9	26.7
All other causes.....	120.1	122.7
Unknown .....	1.0	5.3

In the first place it appears that the total number of deaths from all causes is less in rural districts than in cities. If the percentage given in the table be applied to the estimated population at the present time, assuming that the percentage of persons living in cities is approximately the same as it was in the year 1900, we would obtain the following results.

Total population, 1910, 92,000,000; of which about 67 per cent live in rural communities, or 61,640,000; while the city population, representing about 33 per cent amounts to 30,360,000. Applying the death rate in the above table for cities to the city population, we would have a total of 502,336 deaths occurring in the cities. Taking an equal population in rural districts and applying the rural death rate, we obtain 423,825 deaths in an equivalent rural population. This gives a difference of 78,511 more deaths occurring in the cities in the year than in an equivalent population living in rural districts. It may not be unfair, therefore, to attribute this excess of deaths to the unfavorable conditions of city life. It seems to me that we must include in our list of causes of death "city life," and place it in the list with tuberculosis, pneumonia, and other causes.

Some of the comparative death rates from specific diseases in the table are of great interest. It is noteworthy that the typhoid death rate is about the same both in cities and in rural communities; on the other hand there is more malaria in the country than in the city. The deaths from measles, scarlet fever, diphtheria, however, are much more numerous in cities than in the country. All forms of tuberculosis and pneumonia are also greater in cities. Diarrheal diseases, which include infant diarrheas, are

also greater in cities; Bright's disease is considerably greater, and diseases of the circulatory system; while deaths from accident on the other hand are greater in the country districts.

Tuberculosis, pneumonia, bronchitis to which overcrowding and impure air contribute, and measles, scarlet fever, and diphtheria are transmitted from person to person to which overcrowding gives opportunities and are naturally greater in cities. The impure milk and summer heat of cities account for the excess of infant diarrheas. Lack of exercise, the sedentary life of business men, and improper food would account to a certain extent for the excess of deaths from Bright's disease in cities. The presence of mosquitoes in country districts is a reason for the higher death rate from malaria. Impure water supplies and milk supplies is the chief reason for the typhoid death rate being at least as great in the country districts as in the cities. There are, of course, numerous differences in the table which cannot be readily explained. Cancer is not sufficiently understood. The greater death rate from nervous diseases in the country districts is also not so easy to understand.

It is obvious on the whole that there are a number of diseases in the list which cause deaths in rural communities which can be largely prevented by proper sanitary measures. These diseases are the following: Typhoid, malaria, smallpox, measles, scarlet fever, whooping cough, diphtheria, influenza, tuberculosis, meningitis, pneumonia and diarrheas.

#### *Morbidity—Rural vs. Urban*

It is not possible to secure accurate statistics of the kind and of the extent of illness existing in rural districts as compared with other sections. One can see how in general the number of diseased persons at any one time in rural districts is likely to be less than the number in cities, because the death rate is less. Yet this only applies to those diseases which are common to both city and country, and which are common causes of death. There are diseases on the other hand which are not common to the country and city, and which may not be included in the usual list of mortality statistics.

Prominent among the diseases peculiar to country districts must be mentioned infection with intestinal parasites. In Porto Rico from 90 per cent to 100 per cent of the population in the year 1900



were infected with hookworm. Over 31 per cent were infected with a parasite known as the eelworm, while infections with other parasites existed to a less degree. In the middle and northern United States 7.69 per cent of the population are infected with the whipworm and with other parasites to a lesser degree. In the Southern states the number of persons infected with hookworm exceed the infections with all other parasites combined.

In the Philippines 80 per cent of the population are infected with intestinal parasites of one or more kinds. All of these infections are peculiar to country districts and are not found so commonly in cities. They fall into the catalogue of preventable infections and for that reason come within the scope of the diseases to be considered by sanitary science.

### *Household Sanitation*

In the application of sanitary measures to rural communities, as in fact to any community, perhaps the first item to be considered is the cleanliness of the dwelling. More attention has been given to this branch of sanitation in the past than to any other. In fact it has not been the sanitary expert or the professor of sanitary science who has emphasized the importance of cleanliness in the household, so much as the housekeepers themselves. Dutch housewives for centuries have been proverbial. In certain parts of New England extreme attention is given by housewives to certain features of cleanliness. One may visit almost any rural community in the New England states and be impressed with the degree of anxiety shown by the housewives for the removal of dust and the sweeping of rooms. The semi-annual "house-cleaning" is almost a religious ceremony. It is, perhaps, unfair to remark that the degree of attention given to this branch of sanitation is out of all proportion to its importance, and that the very home in which it is exercised to the highest degree may be drinking polluted water and may possess unsanitary methods for the disposal of sewage, drainage and household waste, and is very likely to have a large manure pile within easy distance of the kitchen door. It is a fact that these external conditions have only come to be recognized as important factors to the health of the household in comparatively recent years.

*Dish Washing*

The necessity for internal cleanliness of the building, its floors and walls, of rooms and of the removal of dust and dirt is so deeply impressed upon the housekeeper in rural communities that it needs no further emphasis. There is one feature of household sanitation, however, which does deserve special attention. This is the washing of dishes and other utensils used in the kitchen and dining room. The transmission of the bacteria inhabiting the nose and mouth and throat and lungs, and such bacteria as may be clinging to the hands and fingers is particularly easy by means of the kitchen and table ware. The handling which such implements receive during the family meal is one which readily conveys any personal infections to their surfaces. Influenza, tuberculosis, pneumonia, bronchitis, sore-throat, tonsillitis, diphtheria, scarlet fever, measles, typhoid fever, dysentery, and other infections which cause discharges from any portion of the body, particularly from the mouth and nose, can become attached to table ware in a way which prevents them from being removed unless they are thoroughly washed and sterilized. It is a common thing for knives and forks used by a person infected with tuberculosis at one meal to be used by some other person at the next meal, and in this way serious chances of infection may occur. Consequently the washing of these implements is a most important matter.

A survey of the methods in common use in the average household shows that this operation is often a hasty one or is left in the hands of some ignorant servant or even when done under the supervision of the mistress herself is not done in a scientific manner. Soaps which do not dissolve grease or remove clinging matter are used instead of solutions of soda. The use of one pan of water unchanged, or infrequently changed is common rather than several pans of water frequently changed so that all utensils shall receive a thoroughly clean rinsing. Dish rags are used instead of brushes, and the final scalding with boiling hot water is frequently omitted. By the use of brushes, solutions of soda, a thoroughly clean rinsing, and finally scalding water, dishes and table ware can be washed and sterilized so that they stand no chance of conveying infection from person to person.

*Air*

One of the highest places in the list of causes of death in rural communities is occupied by tuberculosis. The only disease approaching it as a cause of death is heart disease and other diseases of the circulatory system. At first thought, the open air life of persons residing in rural districts is hard to reconcile with the great extent of tuberculosis in such communities. It is, of course, necessary to remember that tuberculosis is caused by bacteria and that it is commonly a chronic disease which means that the person infected therewith carries the bacteria in his system for a considerable length of time and is usually a source of infection to those among whom he dwells. Houses have been credited with being haunted by tuberculosis. Records show that persons dwelling in certain houses come down with the disease while those dwelling in other houses do not. In large cities, departments of health show by their maps certain blocks, and particularly tenement houses, in which large numbers of cases of tuberculosis have occurred year after year. In rural communities the same thing is true, and certain houses are pointed to as being the home of this disease; but while it is true to an extent that the floors and walls of dwellings may for a limited period retain tubercular infection, we now know that the transmission of the disease is usually more direct and that it is the fresh discharges from tuberculous persons that are most to be dreaded, and are the principal causes for the prevalence of this disease. It is the carriers of tuberculosis living in rural communities who transmit the disease to the members of their families and to those with whom they come in contact.

But in the pure air of the country one would naturally expect to find a very much smaller death rate from tuberculosis than in the cities. Summarizing the figures in the previous table it appears that in cities the death rate from tuberculosis is 198.3, while in rural districts it is 136.6 per hundred thousand population.

One of the chief reasons for this high mortality in rural districts is the practice of sleeping with closed windows. This is almost universal on farms and in villages. While the farmer may breathe pure air all day long yet when he retires at night he conceives it to be necessary for his comfort to have his bedroom window tightly closed. Whether the reason for this be that in the winter

time he fears the cold and in the summer time he fears invasion of insects, yet it is a common experience to find the air of country bedrooms foul and close. For this reason at that period in the twenty-four hours when the process of repair is uppermost, the dweller in rural districts probably breathes air as foul, if not more so, than the dweller in the large city.

The ventilation of the country house is rendered comparatively easy because open fire places are so common. The proper management of the windows of the dwelling is all that is necessary to insure an abundant supply of fresh air to the inhabitants at all times. The use of stoves, open fire places and kerosene lamps which rapidly consume oxygen makes window ventilation even more necessary.

In the country house proper attention must be given to the condition of cellars to prevent dampness and damp air on the first floor and to the removal of all decaying vegetables and refuse and to the prevention of odors from manure and from the stable.

### *Light*

The necessity of sufficient light to the country dwelling is so elementary that it seems hardly necessary to mention, yet it is worthy of remark because of the common practise in rural communities of keeping certain portions of the dwelling in constant darkness. Parlors which are only used for weddings and funerals are common, and shutters and curtains are used to darken rooms to prevent carpets and upholstery from fading. But the absence of light results in dampness and deprives these rooms of the benefits of nature's own best disinfectant. I think, however, that the disinfecting power of light as applied to dwellings has been somewhat over-emphasized. At the same time it must be remembered that human beings were not made to live in darkness and that light has an important stimulating action on the human organism. The late lamented Commissioner Waring was accustomed to say that "Faded carpets were of much less importance than faded cheeks."

### *Water Supply*

If one were to attempt to determine just what class of diseases was increased by existence in rural districts, one would naturally examine the results upon those who have been accustomed

to dwell in cities when a change is made to a rural existence. In this connection we may refer to the history of disease in armies on the march and in time of war, when large bodies of men leave their settled camps and enter into a strictly rural type of life. In the Mexican war the chief cause of death was diarrhea; in the Crimea, typhus, malaria and typhoid were the causes of death; in the Civil war dysentery and malaria were at the head of the list; in the late Spanish war the order was malaria, dysentery and typhoid; in the Boer war the chief diseases were typhoid and dysentery; in the Japanese army beri-beri, dysentery and typhoid were the prevailing diseases. Inflammation of the intestines were in most of these instances the cause of death.

The water supply is without question the readiest means for the transmission of infections which cause intestinal disease. This is because the bacteria of intestinal infections so often contaminate water supplies through contact with sewage or the drainage from outhouses. The dug well is the most common form of water supply used by rural dwellers. It is usually the easiest method for obtaining water and can be located at a point convenient to the kitchen door. It is also a common practice to have out-door privies located at a convenient distance to the house, and in many instances their location is one which makes contamination of the well easy. Well water is also frequently contaminated by barn-yard drainage and stable drainage. Surface washings from the door-yard and from the laundry and from the kitchen sink may also find their way into the well. A large number of examinations have been made of wells on farms both in the east and in the western part of the United States, and a summary of the results shows that at least 60 per cent of the wells examined were seriously contaminated with the bacteria which are identified with sewage.

Cisterns and springs in like manner may be contaminated. Outbreaks of typhoid fever from these contaminations are so numerous that the literature is filled with their reports. I may quote one instance which came under my personal observation, namely, that of an Episcopal parsonage on Long Island, where a number of cases of typhoid appeared in the family without apparent cause. Drinking water was obtained from a cement cistern which was supplied by rain water collected on the slate roof. This water supply seemed to be most carefully protected from contaminations.



The house was equipped with modern plumbing, and the drainage ran through sewer pipes to a cesspool which was located several hundred feet away from the cistern. When a lantern was lowered into the cistern black streaks were noted oozing through a crack in the cement wall. When an excavation was made in the earth at the side of the cistern a break was discovered in the sewer pipe leading from the house, and the ground between the pipe and the cistern was saturated with sewage. There is no doubt that some visitor to the family caused the first typhoid case by polluting the drinking water, and that the disease was continued by further pollutions of succeeding cases.

A pure water supply is positively necessary for health. A reasonable per diem allowance is from fifty to seventy-five gallons per capita. The running water of brooks is a safe source of supply, provided there are no dwellings which drain into it. Rivers and lakes, while often a source of supply for cities, can be of use only to the rural districts located on their shores. Wells and cisterns must continue to be the main reliance of country dwellings. Among these the driven and artesian wells are the best type. A reason for this is that when properly constructed they do not receive surface washings or surface water, but are sealed at the top and draw their supply from a considerable depth beneath the surface. Deep ground water usually comes from a considerable distance, and has passed through such an extent of soil and rock that it has been thoroughly purified.

Dug wells, which draw their water only from the surface layers of the soil, may furnish safe supplies only when located at a considerable distance from possible sources of pollution, and when properly protected against surface washings. One good method of protection is to dig a circular trench three or four feet deep at a distance of about six feet from the edge of the well which can be filled with rough stone so that all surface washings will fall into this trench rather than into the well; by a suitable underdrain leading off from this ditch all surface water can be led away from the well. Another safeguard is to close entirely the top of the well, using no ropes or buckets, but having a pump attached which discharges the water considerably to one side of the well opening, thereby preventing any of the discharged water from falling back into the well.

There are now a number of types of efficient filters at reasonable prices, which can be supplied for country residences and can be attached to wells or cisterns or other sources of supply, and when properly operated will remove any chance pollutions that may occur in the waters. In emergencies sterilization of the water can be performed by boiling and by the use of chemicals, among which chloride of lime is best.

### *Foods*

Fresh food of all kinds is associated in one's mind with country life. Consequently at first thought one would assume that sanitary science had little comment to make on this subject. In the matter of vegetables and fruits there is in fact but little to be said, not only for the reason that such fruits are usually produced on the premises, but because their preservation has been such a matter of study and practice in rural communities that most country housewives are proficient in the canning and drying of fruits and in the proper care of winter vegetables.

In the matter of meat and fish, however, there are some improvements that can be made. The lack of ice and facilities for refrigeration is very common. The cellar is often the only means for keeping food cool. The temperature of a cellar is not sufficiently cool to furnish any real preservative action on meats or on fish. The decay of meat and fish is caused by the bacteria of putrefaction which produce poisonous substances known as "ptomaines." Ptomaine poisoning is the name given to the severe symptoms which follow the eating of decayed meat and other foods.

It is therefore to be recommended that in those parts of the country at least where ice forms in the winter, rural communities make a practice of gathering ice and using it for refrigeration during the warm months of the year.

Meat and pork used in country districts are for the most part killed by local butchers and are a local product. The meat of these animals is not subject to scientific inspection and for this reason may at times be diseased. Tuberculosis has become very common among beef cattle in this country. In Europe it is estimated that forty per cent of the cattle are diseased with bovine tuberculosis; and in the United States a summary of the various estimates range from thirty-three to three per cent, with the disease probably on

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the increase. From the examinations which have been made of human beings afflicted with tuberculosis it appears that the bovine type is practically limited to children. For this reason it seems likely that it is not often transmitted through diseased beef. The cooking of meat may be one reason for this. At the same time it would be in the interest of the inhabitants of rural communities if a better system of meat inspection could be established.

A more serious threat against the health of rural communities is found in the parasites which inhabit both beef and pork. The term "measly" beef and "measly" pork is used to describe the flesh of animals marked by the larvæ of tape-worms. Unless such meat is thoroughly cooked it causes tape-worms to develop in the intestines of those who consume it. Swine are particularly likely to be infected with this disease, and the thorough cooking of pork and of ham must be carried out to prevent the infection from being transmitted.

*Trichina* is the name of a species of worm which infects at least two per cent of the hogs in the United States. These also infect man and cause much physical discomfort. They are easily killed in pork by proper cooking.

### *Milk*

A leading physician in one of our large cities stated to the writer that it was a great pleasure for him to take a trip to the country so that he could secure a drink of milk which had in it the real "cowey" flavor. He expressed surprise that the flavor which he so desired was entirely absent from the glass of milk he was drinking on the premises of a certified dairy. It was necessary to explain to him that this "cowey" taste was not natural to milk, but was due to its pollution with cow manure. His remark, however, illustrates how common the pollution of milk with cow manure is because he is no exception in believing that the so-called "cowey" flavor is natural to milk.

Milk in the country is fresh, but it is not necessarily clean or free from infectious diseases. Those who dwell in country districts have the great advantage of securing milk before it has become many hours old; but in many instances the milk is obtained from cattle which are diseased, and is handled in a manner which exposes it to contaminations with dirt and with bacteria.

A prominent veterinarian who has examined over twelve thousand cows in New York State by means of the tuberculin test, asserts that in his opinion sixty per cent of the dairy cattle furnishing milk to New York City are infected with tuberculosis in some degree. Examinations made of milk sold on the streets of New York City and of the cities of Washington and Chicago, and of Leipsic, Germany, show that the bacteria of tuberculosis are present in more than ten per cent of the samples examined. Consequently we must believe that a considerable part of the milk which is used in rural communities is infected with tuberculosis. This is a matter more serious for the children and babies than for the adults.

Manure and dirt from the stable or from the cows' udders and coats, from the hands of the milkers and from the milking pails and pans are all offensive to the sense of decency, if not a menace to health.

Bacteria of typhoid fever, scarlet fever and diphtheria are often transmitted through milk. These bacteria get into milk from persons engaged in milk handling or from the water in which milk utensils are washed.

It is possible for the average farmer to produce a clean and safe milk for his own use and for the use of his neighbors by very simple and inexpensive means. His cattle can be kept in perfect health with the assistance of a competent veterinarian, and it is to the financial interest of the farmer in the long run to see that this is done.

By the use of tar paper and whitewash and home-made cement he can have a sanitary cow stable at small cost.

A covered milking pail or milking can in place of the old-fashioned wide-mouthed pail will keep nine-tenths of the dirt and bacteria out of the milk during milking time. By the use of a brush and a solution of soda followed by a rinsing in perfectly clean water and a final scalding with boiling water all milk utensils can be kept clean and sterile.

Milk for family use may be had twice daily and should be used on the farm as fresh as possible. For all milk that is to be carried to a village or town, preservation with ice is positively necessary. Where ice cannot be had upon the farm, several farmers in the district can combine their interests, and by co-operation se-

cure a supply of ice at some central place to which their milk can be carried for refrigeration. This plan makes the cost to each farmer a very reasonable one.

### *Sewage Disposal*

Perhaps the most difficult problem to be faced in rural communities is the proper handling of sewage. This includes not only the bowel discharges of the inhabitants, but the drainage from laundries, kitchens, barnyards, etc. Large cities are usually located upon rivers and lakes, into which the sewage can be discharged and disposed of by dilution with great quantities of water. Rural communities, which are for the most part located inland, have no such facilities and must find some means of disposing of their sewage in the earth.

The discharge of sewage into a brook or running stream is a most dangerous proceeding because of the chance that the water of this stream will be used further down for drinking purposes. Many of the states have laws prohibiting the pollution of streams in this manner, and therefore streams should not be looked upon as available for these purposes. In the Southern states conditions are probably worse than in any other part of the country. The climate encourages a continued outdoor existence throughout the year and many of the inhabitants are ignorant and unsanitary in their habits. This leads to the promiscuous distribution of bowel discharges on the ground in country districts. Such exposure is believed to be the chief cause of the wide-spread infection of hookworm. The hookworm inhabits the bowels and infects the soil wherever discharges are deposited. A large percentage of the inhabitants wear no shoes, and the mud clinging to their bare feet often contains the parasites. The hookworm pierces the skin of the feet and finds its way to the intestines, where the eggs of the next generation are hatched.

Bowel discharges of typhoid patients are of course a most serious threat against the health of those who dwell in the neighborhood. If such a discharge is made on open ground it is exposed to flies, which may carry the infection to the nearest kitchen and transmit it to food or to milk. Many cases are recorded where rain has washed the infection from such discharges into a nearby



well or stream which was used as a water supply, and which produced typhoid fever in the persons drinking the water.

One case may be mentioned which came under the writer's observation, where Italians, camped on the bank of a brook, deposited their bowel discharges on open ground. One of their number having typhoid fever, thereby infected the waters of the brook which was used as a source of supply by five different villages, in which there occurred immediately a typhoid outbreak of over forty cases and seven deaths.

Cesspools and wooden privies are the most common establishments in rural districts for the disposal of the bowel discharges of the inhabitants. The vaults of these are often made of loose stones without any provision for overflow. There is consequently not only a leaching through nearby soil, but an actual overflow on to the surface of the soil. From this exposure, both by means of insects flying to the houses and by the washing of rains into water supplies, infections can be easily carried to the inhabitants of the surrounding country.

The earth closet is the readiest means for the sanitary disposal of the bowel discharges of those who dwell in isolated houses. This consists of the ordinary small wooden building supplied with water-tight cans of metal into which the discharges are received and into which is thrown at the same time a certain quantity of fresh earth shoveled from a box kept in the closet. Lime is also a very good material to mix with such discharges. The iron receptacle should receive a sufficient amount of earth to absorb liquids, so that when it is filled the contents are solid. It should, of course, be frequently emptied and carried to a remote place where the contents can be buried at a suitable depth and covered up with earth. This method of disposal is safe, simple, and cheap, and can be adopted by any isolated farm-house.

Cesspools are only permissible when they are made tight and small and frequently cleaned, and are not allowed to overflow on the surface of the soil or to leak into the surrounding soil in a way which is likely to contaminate water supplies.

The burning of bowel discharges, as it is carried out at times in armies, is an ideal method because it absolutely destroys all chances of infection. The use of disinfectants, such as chloride of lime, is also to be highly recommended.

Where houses are gathered together in groups and in small villages or camps it is economy to provide a common system of sewage disposal, so that all sewage will be delivered through pipes to one plant. Such a plant should be so located that it will not constitute a nuisance to any of the dwellings. Some of the simpler from among the many and expensive plans for the disposal of sewage are adapted for use in small communities. Among these may be mentioned the system called "sub-surface irrigation," in which shallow ditches beneath the soil intermittently receive the sewage and it is digested and absorbed by the biolytical processes of the upper layers of earth. Another method adapted for this purpose is one where a preliminary screening and filtration is followed by the disinfection of the fluid effluent, with such chemicals as chloride of lime. The handling of propositions of this kind is of course beyond the powers of the average citizen, and such installations must necessarily be placed in the hands of specialists.

Water from sinks and laundries in farm houses is usually allowed to run out on to the surface of the ground, where it is likely to collect and to form a wet and unsightly and ill-smelling place. Such water should be led away from the house through pipes, where it can be caught in a cesspool filled with gravel or broken stone. Most of the solids will be retained in this way and the liquid portion carried off by seepage into the surrounding soil. The location of such a drain should of course be one which is remote from the source of water supply.

### *Garbage Disposal*

A pig pen is a valuable institution in one respect, namely, that in many parts of the country it is a ready and sure means for garbage disposal. All waste food and kitchen refuse can be carried to the pigs and will be consumed by them, so that there is no nuisance other than the pig pen itself. Where garbage cannot be gotten rid of in this manner it is necessary to devise a system of garbage disposal which will prevent the indiscriminate throwing of waste food on to the ground in the neighborhood of the house. Accumulations of this sort are bad from a sanitary standpoint not only because they are unsightly and cause offensive odors, but particularly because they attract flies which breed and multiply in such places and may transmit infection to the household.

Wet garbage and food of all kinds should be kept separate from ashes and from trash. A water-tight can is the best sort of receptacle for garbage. Ashes should be placed in another can and trash can be placed in a box. Ashes are not seriously objectionable in character. They can be utilized for walks and roadways and thrown upon the ground without harm. Cans of wet garbage and trash are best disposed of by burning. Rural communities composed of several houses or villages can afford to maintain a crematory of simple form where all of these wastes can be burned up. One of the simplest of these is called a "rock pile" crematory. It consists of stones so grouped together that liquids will filter down between them while solids are retained on the surface. A good supply of air is received through the crevices in the stones and all of the contents can be easily burned up.

In isolated houses, where it is not convenient to maintain a crematory combustible trash can be burned up while wet garbage can be carted off and buried or dumped at a distance remote from the dwelling.

### *Manure*

The manure pile has lately gained recognition as deserving more than ordinary consideration by the sanitarian because it is the headquarters for flies in its immediate neighborhood. Flies breed best in manure. The manure pile has for many years been looked upon as a necessary part of the farm business. The wealth of a farmer used to be judged by the size of the manure pile in his barnyard. The study of agriculture has now shown that the accumulation of manure from horse stables and cow stables in a pile is not the best method for its preservation, but that great waste takes place due to the fermentations and escape of gases from such a deposit. The largest dairies now make a practice of spreading all manure upon the ground daily and none of it is accumulated.

The odors from the manure pile while offensive are not necessarily injurious to health. One of the most recent faults found with these accumulations is due to the discovery that the germs of tuberculosis are very often discharged through the bowels of tuberculous cattle, and consequently the manure pile may be filled with this infection. The breeding of flies in the manure pile is one of the reasons why the household is afflicted with flies in the

summer time. These insects are a menace to health not only because of the material which they may carry from the manure pile, but because they may travel to the surrounding country and feed on matter which contains infection. Much of the typhoid which occurs during the summer and fall months is attributed by some authorities to the prevalence of flies during those seasons of the year.

Recently the writer made an investigation of a typhoid fever outbreak in which at least twenty cases occurring in one summer encampment were probably due to the infection of food with the germs of typhoid fever by flies which had been bred in a nearby manure pile which at times received the discharges of a man who was afflicted with typhoid in a chronic form.

The best remedy for the manure pile is to have none. If it is necessary it should be placed as far as possible from the house. If this cannot be done another easy remedy is to surround it with screens so that flies cannot gain access to it. The application of disinfectants, such as chloride of lime and ordinary unslacked lime, are also measures which will prevent odors and make the heap unattractive for flies.

### *Mosquitoes*

The mosquito is now held chiefly accountable for the spread of malaria, yellow fever, black water fever, dengue, and filariasis. Malaria is the disease of greatest interest to the inhabitants of the United States, because the other diseases are comparatively rare in this country. Mosquitoes lay their eggs in water. The eggs float on the surface of the water and hatch out, forming larvæ which live near the surface. These in a short time grow and develop into adult mosquitoes which fly up from the surface of the water and begin their adult life. Standing water is necessary for these purposes. Running brooks and rivers are not breeding grounds for these insects. In Cuba, Mexico and Central America the common source of water supply is cisterns. Mosquitoes have access to many of these and use them as breeding grounds. The substitution of city water supplies by pipe lines and the abandonment of cisterns have reduced the number of mosquitoes and the diseases contracted from them in a remarkable manner in some of these cities. One of the most remarkable instances is the banish-

ment of yellow fever from the city of Havana, which was accomplished not only by removing the cisterns and standing water but by protecting buildings with proper screens against these insects. In the Panama Canal the fight against the mosquito is the real secret of the success of the American enterprise in that region.

Malaria is transmitted by the mosquito through the biting of some person suffering from that disease whose blood contains the parasites which are sucked with it into the body of the mosquito where the parasites remain. Such a mosquito may later on bite some other person and inject the parasites into his blood, giving rise to malaria in him. The vital statistics show a greater prevalence of malaria in rural communities than in cities. It is obvious that cities are not so favorable to the growth of mosquitoes as are rural districts. In the country there is not only likely to be some standing water, but a greater abundance of the green plants on which the mosquito commonly feeds.

The fight against mosquitoes in rural districts must be carried on first by the drainage of all standing water in the neighborhood of the house. Even old tin cans and pails and the rain barrel and the horse trough are places where mosquitoes will breed. Where they have become a pest and standing water cannot be drained off, the application of kerosene to the water every two weeks will prevent the multiplication of these insects. The kerosene spreads over the surface of the water and kills the eggs and the larvæ.

When insects have once invaded a house so that they cannot be driven out by ordinary means they can be killed by fumigation. Sulphur is the best material to use for this purpose. The burning of a sulphur candle in a properly closed room will kill all the mosquitoes and other insects. The screening of windows and of doors is another important item in the prevention of malaria. Screening is being constantly more widely adopted, and it is a practice which should be insisted upon in rural districts.

This screening should include not only the house but also the place where garbage is kept, and if the garbage-can itself is not covered a screen cover is a good thing to use. The privy must also be thoroughly screened against flies, so that by no possibility can they gain access to the discharges contained there. Where cases of malaria exist the patients should be thoroughly protected against mosquitoes, for in this way it is possible to prevent the disease



from being transmitted from a malarial patient to those who dwell in the neighborhood.

### *Education*

The most important of all sanitary considerations in connection with rural communities is the matter of education. The people themselves must be informed concerning the progress of sanitary science and how to follow a system of clean living if they are to gain the benefits which are to be derived from sanitary knowledge. The best place to begin sanitary education is in the district schools. The old system of teaching physiology and hygiene and the "nature studies" which are now used in the district schools are not sufficient to give the children correct ideas on sanitary matters. There is a movement on foot at the present time to bring about this kind of sanitary instruction in the public schools. It is delayed in the first place because the teachers themselves are comparatively ignorant on sanitary matters. It is therefore necessary to establish a system of sanitary instruction for school teachers, and through them eventually the children in the schools can be reached. Children should be made familiar with the meaning of the word "bacteria" and especially taught the nature of infectious diseases so that they will know them by name. They should also be clearly instructed as to the cause of infectious diseases, and particularly such diseases as are likely to occur in their own part of the country. Simple but important instruction on water supplies, milk supplies, and sewage can be given.

Next to the district schools, the state and county boards of health can play a most important part in education by the regular publication and distribution of bulletins on public health matters. The activity displayed by the Department of Agriculture and the experiment stations established in different states is an illustration of how this kind of work can be done. Persons living in rural communities are all familiar with the bulletins on agriculture. If they could be made equally familiar with bulletins on public health matters it would lead to a great improvement in the sanitation of their dwellings and of their surroundings. Realizing this, some of the states have made a commendable beginning by the publication of occasional bulletins on such matters, but the appropriations of

money for these purposes are so small that the bulletins do not cover the ground and are not regularly distributed.

*The Sick are Carriers of Disease*

Perhaps one of the most vital reasons for popular education on these subjects lies in the discoveries which have lately been made of the existence of chronic cases of infectious diseases which were formerly thought to be entirely limited to cases in the acute form. It is now known that typhoid fever is not entirely limited to those persons who suffer from acute attacks, but that it may become established in a chronic form and the bacteria remain in the system of some persons for many years. The records show that these bacteria have been carried for more than fifty years in persons who gave no external appearance of having the disease. A recent estimate by one investigator shows that as many as four per cent of the persons having typhoid fever continue to carry the bacteria in their bodies and to discharge them for as long as three years after they have apparently recovered from the disease. One investigator estimates that there are at the present time eighteen thousand persons in apparently good health in the United States who carry the germs of typhoid fever and who must be looked upon as a threat against the health of the communities in which they live. At any time such a person may be the cause of a typhoid outbreak. Tuberculosis has of course for many years been recognized as a chronic disease and the persons afflicted with it as sources of infection. More recently diphtheria has been shown to exist in a chronic condition, and it is beginning to be accepted that in this way the disease is carried on from year to year. There are rumors that scarlet fever is also a disease which exists in a chronic form in some persons, and that it may be passed on in this manner. Possibly in time other infectious diseases will come into the same category. These things being so the matter of personal hygiene on the part of those who are afflicted with these infections in a chronic form is positively necessary to protect their neighbors from contracting the disease from them. On the other hand, the personal care exercised by the individual in his daily conduct toward his neighbors, the food he eats, and the liquids he drinks are the only means at his command for protecting himself against these chronic carriers of disease. It is obvious that public education on these matters at

the present time is the best form of defense. The majority of persons carrying these diseases are undiscovered. The more closely therefore that one adheres to strict personal cleanliness and avoids contact with one's neighbor is one likely to escape accidental transfer of these diseases.

It is to be hoped that public sentiment on matters of sanitation and of general health will in the course of time reach the same degree of interest that is displayed in the study of agriculture. It does not seem unfair to suggest to the public authorities that at least as much money should be spent in instructing the dwellers in rural communities how to raise their own children and to protect themselves against infectious disease, as is now expended in informing them how to raise pigs and how to breed cattle and horses.

# TROPICAL DISEASES AND HEALTH IN THE UNITED STATES

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*Introduction.*—Many of the problems that demand solution at the hands of the sociologist concern the parasites that infest the body politic, impairing its efficiency. The physician, on the other hand, particularly he who is engaged in the solution of the problems of sanitation, is concerned to a very large extent with the study of the parasites that infest the physical body, producing sickness and death.

Since the development of modern bacteriology, which saw its beginning in about 1870, the knowledge of the causes of the acute infectious diseases of man has had an interesting and rapid evolution. Following naturally the discovery of the exciting causes of various diseases, the methods of preventing the development of those maladies were rapidly worked out. But it was soon found that some affections that acted like other acute infectious diseases of known etiology could not be associated with a discoverable bacterium in the relation of cause and effect. The discovery by Laveran, in 1880, of the *Plasmodium malarie* and the demonstration of its animal characteristics led to fresh investigations. These studies, in turn, showed that some of the acute infections were due to animal parasites. The understanding of the life history of these organisms, however, has proved to be a much more complicated matter than the description of the biological characters of the vegetable parasites.

It has been found that many of the animal parasites of which man is the host cannot be transmitted from one individual directly to another. The parasitic organism requires a developmental period in an intermediate host before it can be inoculated into another individual there to develop and produce disease. The parasitic form which infects the intermediate host is usually different in

morphology from that which produces the disease in man. The intermediate hosts are usually insects or some other animal low in the zoological scale. These low animal forms require warmth, moisture, and oxygen for their development. These three requisites are also necessary for the development of the parasites themselves, as well as for the growth of the vegetable parasites, bacteria, that produce disease.

All of the lower forms of life, whether animal or vegetable, flourish best in warm, moist climates, so that we find some regions of the earth more unhealthy than other regions, on account of the greater amount of moisture and heat with the resulting profuse growth of the lowest forms of life. In addition to heat and moisture, the lower forms of life require a certain amount of food in the nature of decomposing animal and vegetable material. This is found in abundance in hot, moist climates, particularly when no effort is made to prevent the accumulation of such decomposing masses. Furthermore, a hot, moist climate is debilitating to the human organism, so that initiative and energy are lacking and a disposition is developed to let things go as nature apparently means that they shall go: the spirit to improve conditions is lacking. Consequently, we observe the establishment of a vicious circle; the native is lacking in energy; he permits masses of decomposing animal and vegetable matter to accumulate in the vicinity of his dwelling; this breeds the lower forms of life which are able to develop the parasites that produce disease; these parasites infect the dweller in their neighborhood. Those inhabitants that escape death are still further reduced in vitality and their efficiency is still further impaired. Furthermore, they are carriers of disease-producing parasites which increase in number, until finally, the neighborhood acquires an unenviable reputation as a pest hole.

*Climate.*—The climates of the world are divided by Dr. C. Hart Merriam (National Geographic Magazine, 1894, Vol. VI) into the Tropical Zone, the Lower Austral Zone, the Upper Austral Zone, the Transitional Zone, and the Boreal Zone, according to the total amount of heat present during the year. In the Tropical Zone there is 26,000° F. of heat during a year, the hottest period showing a maximum temperature of 78.8° or over. In the Lower Austral Zone the total heat amounts to 18,000° F. with the hottest period above 78.8°. In the Upper Austral Zone the total heat is 11,500° F.,



with the hottest period below  $78.8^{\circ}$  F. In the Transitional Zone the total heat is  $10,000^{\circ}$  F., with the hottest period below  $71.6^{\circ}$  F. In the Boreal Zone the total heat for the year is below  $10,000^{\circ}$  F. and the hottest period is below  $64.4^{\circ}$  F.

The Tropical Zone extends from the Tropic of Cancer,  $23^{\circ} 30'$  north of the equator, to the Tropic of Capricorn,  $23^{\circ} 30'$  south of the equator. But north of the Tropic of Cancer and south of the Tropic of Capricorn there is a belt, the Lower Austral Zone, in which for a considerable part of the year the climatic conditions are similar to those in the Tropical Zone. In the United States, this zone includes all of the Southern and Western states below the thirty-fifth parallel of north latitude: South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas, and parts of North Carolina, Arkansas, Indian Territory, Oklahoma, New Mexico, Arizona, and California. It is even probable that this line could be pushed as far north as the fortieth parallel. In 1909, for example, Philadelphia had a total amount of heat of  $20,153^{\circ}$  F., this is over  $18,000^{\circ}$  F. During the hottest period the thermometer registered above  $78.8^{\circ}$  F. Even subtracting the 558 degrees excess temperature over the normal temperature for Philadelphia in 1909 the total heat would be 19,593 degrees, enough to include Philadelphia, which is  $39^{\circ} 57'$  north latitude, in the Lower Austral Zone. In 1910 the total amount of heat was  $19,861^{\circ}$  F., with the hottest period above  $78.8^{\circ}$  F. Similar studies would show that many places in the United States possess the necessary amount of temperature for their inclusion in this zone.

*Requisites for the Development of a Disease from the Tropics.*

In order, however, that any disease shall develop in a given region of the world, three essentials, in addition to a proper climatic condition, must be present: the cause of the disease, the proper transmitting agent, and susceptible individuals. Climatic features may be suitable, the cause of the disease may be present, susceptible individuals may reside in the district; but if the transmitting agent is absent the disease will not develop. If now the transmitting agent is suddenly introduced into that locality an epidemic of the disease will result.

On the other hand, the transmitting agent may be present and susceptible individuals may reside in a locality; but if individuals harboring the parasites be not present, the disease will not be

found. If now human hosts of the parasite come to the region in question bringing the parasites with them an epidemic will follow.

*Relations of the United States with the Tropics.*—The Anglo-Saxon race has had intimate relations with the tropics for over three hundred years. In 1579 Thomas Stevens sailed from Lisbon to Goa in India. So far as is known he was the first Englishman to visit that great empire. In 1583 three London merchants started overland for India. This enterprise was followed by the endeavor of three ships to make the journey around the Cape of Good Hope in 1591. The fabulous wealth reported to be in existence led to the formation of the British East India Company, which was chartered in 1600, and sent out its first expedition in 1601. Ever since then England has had intimate relations with the tropics and has known at first hand of the ravages of its diseases. That part of the Anglo-Saxon race which resides in the Western Hemisphere has had a merely casual acquaintance with the tropics until the occurrence of the Spanish-American War, in 1898. The acquisition of the Philippine Islands, Puerto Rico, and Guam, followed by our intimate relations with Cuba and the undertaking of the Panama Canal has brought the problems of tropical pathology and tropical hygiene strongly to our attention. We suddenly realize that many of our home ports are within the limits of the Lower Austral Zone: Galveston, 28° 18' N.; New Orleans, 29° 57' N.; Mobile, 30° 45' N.; Jacksonville, 30° 45' N.; Savannah, 32° 4' N., and that the United States-Mexican border extends for a varying distance north and south of the thirtieth parallel of north latitude. We then find that other of our ports have a total degree of heat that would be suitable, for a portion of the year at least, for the development of diseases supposed to be peculiar to the tropics, provided all the essentials were present.

We find 424,313 immigrants landing on our shores from tropical and subtropical countries in 1907, and 224,930 immigrants from the same regions in 1908. Our soldiers, our sailors, our missionaries and our business men are visiting the tropics in greater numbers with the advancing years. We further find that at home we have had for many years a disease common in the tropics, uncinariasis, or hookworm disease, probably imported from Africa with slaves. Tropical medicine, consequently, is a matter of intimate concern to the health authorities of our country, and not a mere academic

question. The immigrant and the homecoming citizen are important enough to require consideration in this respect, if we had never had an epidemic of yellow fever, of plague, or of cholera in our home territory. The prevention of an epidemic of imported disease, however, is a comparatively easy matter when the cause is known, and, at the hands of the United States Public Health and Marine-Hospital Service the introduction of epidemics has been and will be prevented so far as foreknowledge, foresight, and jurisdiction can accomplish the result.

*The Essential Feature of the Prevention of Tropical Disease.*—The one essential feature of prevention of tropical diseases is the cleanliness of our seaports, the cleanliness of our inhabitants, the cleanliness of our houses. By cleanliness is meant the drainage of mosquito breeding marshes and streams, the prevention of the development of flies, and the destruction of rats and mice, as well as the washing of bodies, the fumigation of houses and vessels, the sweeping of streets, the proper disposition of sewage and garbage, and the inspection of food products.

*The Tropical Diseases.*—The following list of disorders may be looked upon as including the diseases indigenous to tropical and subtropical countries which can be transmitted to temperate climates, upper austral and transitional, provided the requisite conditions of heat, moisture, intermediate hosts, parasites, and susceptible population are present in the given locality.

A. Disease due to protozoan (one-celled) parasites:

- 1, malaria; 2, hemoglobinuric fever; 3, amebiasis; 4, trypanosomiasis; 5, kala azar; 6, spirochetosis: (a), relapsing fever; (b), Rocky Mountain fever; (c), tabardillo.

B. Diseases due to metazoan (many-celled) parasites:

- 1, trematode infection; 2, cestode infection; 3 nematode infection.

C. Diseases due to bacteria:

- 1, plague; 2, cholera; 3, dysentery; 4, Malta fever; 5, leprosy.

D. Diseases of unknown etiology:

- 1, yellow fever; 2, dengue; 3, beriberi; 4, pellagra.

Malaria is a disease indigenous to the tropics and to subtropical countries. It is caused by a genus of protozoan parasites, known as *Plasmodium*, of which there are at least three, and, according to some writers, more species. The parasite is known to undergo a cycle of development within its human host, which perpetuates the disease in the individual. While the various steps in this cycle are taking place regularly, a second form of development of the parasite takes place, which results in the production of forms that produce no symptoms in the human host; but which are capable of infecting the intermediate host. The intermediate host of the *Plasmodium* is the female mosquito of the subfamily Anophelinæ. Not all species of anopheles mosquitoes can become infected from the human host, but at least seven have been shown by actual experiment to be the efficient agents for the transmission of the disease. Manson, however, gives a list of thirty-two species from various parts of the world which are known or suspected to be efficient hosts of the *Plasmodium*. After the parasite has passed through its developmental stage in the body of the mosquito, forms result that can be inoculated into a susceptible human subject by the bite of the insect, and so the disease is spread. No other method of transmission from man to man is known.

Mosquitoes always breed in water. Some species prefer clean, slowly running water; others prefer stagnant water; still others breed in collections of water in artificial containers. The members of the subfamily Anophelinæ prefer, as a rule, the clean, slowly running water found at the edges of streams and in marshes in which there is some current.

The amount of sickness due to malaria in a malarial country is incalculable. Woldert (*Texas Medical News*, April, 1908) estimates that malaria causes the loss of an equivalent of over five million dollars a year in the State of Texas alone. The most efficient way to prevent the sickness and death due to this disease is the destruction of the breeding places of the intermediate host of the parasite. Marshes should be drained or filled in. Streams should be cleaned of the growth of grasses, flags, and sedges which are found near the banks, delaying the currents, and providing by their interlacing roots safe retreats for the mosquito larvæ from their natural enemies. Artificial collections of water should be destroyed or efficiently screened so that the adult female cannot

gain access to them for the purpose of depositing her eggs. All money spent by the state in this work is well invested. The return is seen in the increased efficiency of the individual, in the lowered death rate and sick rate, and, in the case of drained marshes, in the increase in the area of arable land.

A district in which there is no malaria may owe its freedom to the absence of the proper malaria carrying mosquito, to the absence of individuals harboring that form of the malarial parasite in their blood which can infect the mosquito, or to both. If the proper mosquitoes exist in a given neighborhood, but no infected individuals are present, no malaria will be found; but if human hosts, apparently in perfect health, with the suitable form of the malarial parasite in the blood are brought to the region, an epidemic of malaria will result. For example, if a rural district contains swamps or choked streams in which anopheles mosquitoes are breeding, and a gang of Italian or West Indian laborers, many of whom harbor malarial parasites, are imported for the purpose of some public work such as road building or canal excavating, an epidemic of malaria will follow.

On the other hand, a malarial district may be rendered almost nonmalarial by destroying the breeding places of the mosquitoes. The active work of the Department of Sanitation of the Isthmian Canal Commission in searching for and destroying the breeding places of mosquitoes in the Canal Zone, and screening the quarters of the employees, has resulted in the reduction of the morbidity from malaria from 821 per 1,000, in 1906, to 282 per 1,000 in 1908, and 215 per 1,000 in 1909. The mortality was reduced from 8.77 per 1,000 in 1906, to 1.34 per 1,000 in 1908, and 1.10 per 1,000 in 1909. This result can be paralleled in any American community by similar methods with a relatively small outlay of money.

The Italian method of furnishing quinine to the inhabitants for prophylactic purposes is not nearly so efficient; nor is a method which relies on screening the dwellings of the inhabitants without a campaign for the destruction of the mosquitoes and their breeding places.

Hemoglobinuric fever, or blackwater fever, is believed by many writers to be dependent upon previous malaria. If this be so, the control of the latter will be attended by the disappearance of the former disease. There are students of tropical problems,



however, who believe that hemoglobinuric fever is an independent disease. If this be true it should be placed among the diseases of unknown etiology. Hemoglobinuric fever is present in the Philippine Islands, in the West Indies, in Central and South America, in the Canal Zone, in Texas, and in Arkansas, and probably in other parts of the lower austral zone of the United States. So far as we know at present its deleterious influence upon the public health is not great and no alarm need be felt for an extensive propagation of cases.

Amebiasis is a disease due to a protozoan parasite, *Entameba histolytica*, which attacks the large intestine of man and of the lower animals. The infection manifests itself by attacks of dysentery, and in many of the cases, as high as 33 per cent in some instances, it is followed by abscess of the liver. The parasite is apparently transmitted from man to man by potable water. It is possible that it may be transmitted by green vegetables, in localities where human feces is used as a fertilizer, as is the custom in China and other Eastern countries. Its spread may be stopped by boiling the drinking water, by the prohibition of the use of human excrement as a fertilizer, and by the prohibition of indiscriminate defecation into streams or other sources of water supply for towns, villages, or isolated farm houses.

Amebiasis is prevalent in the Canal Zone, certain of the West India Islands, some of the Southern states, for example, Louisiana, Puerto Rico, and the Philippine Islands. Individuals with intestinal trouble returning from these countries should be carefully studied for the detection of these parasites.

Trypanosomiasis is a disease due to a protozoan parasite, *Trypanosoma gambiense*. It is at first a febrile complaint which bears some resemblance in its clinical manifestations to malaria; but in its last stages it is accompanied by a marked degree of lethargy and is commonly known as sleeping sickness. The parasite is transmitted from man to man by a dipterous insect; the Tsetse fly, *Glossina palpalis*. The disease is confined to the valley of the Congo River, the shores of Victoria Nyanza, and other parts of tropical Africa. So far as is known *Glossina palpalis* does not breed on the American Continent, consequently no harm is to be apprehended from this disease in the United States, even if an infected individual should land upon our shores. If *Glossina pal-*

palis can be bred in our own lower austral region, the United States Public Health and Marine-Hospital Service will have to institute active fumigation measures on all ships coming from African ports to our Gulf and South Atlantic ports to prevent the domestication of the fly.

Kala Azar is a disease due to a protozoan parasite, *Leishmania Donovanii*. It is found in Assam, Madras and Bengal. The method of transmission of the parasite is not known, and no danger is to be apprehended from this disease. Dr. S. T. Darling, however, has observed a few cases in the Canal Zone similar to Kala Azar, and has found a parasite of similar appearance in the organs of the patients at necropsy. This parasite has been called *Histoplasma capsulatum*. The possibility of serious danger to the public health from such a source is remote.

The best known example of spirochetosis is the European relapsing fever, due to an organism known as *Spirocheta recurrentis*. A few imported cases have been seen in this country and small epidemics have been recorded in New York and in Philadelphia in past years. The parasite is supposed to be transmitted by the bed-bug or the body louse. No extensive epidemic of this disease has been observed in this country and its further prevention will be accomplished by isolating imported cases and by the disinfection of the belongings of the patients for the destruction of any vermin that they may harbor.

In the Bitter Root Valley of Wyoming, and in some other parts of our Rocky Mountain region there is an epidemic disease, known as Rocky Mountain fever, which is known to be transmitted by the bites of certain ticks, *Dermacentor occidentalis*. It is probable that this is a spirochetosis.

The disease endemic in Mexico known as tabardillo, which caused the death of the investigator who proved the transmission of Rocky Mountain fever by the bites of infected ticks, Dr. H. T. Ricketts, is in all probability of the same nature. The public health authorities of the states forming the United States-Mexican border, Texas, Arizona, New Mexico and California, will have to meet the problem of the prevention of the importation of this infection into our domain with the increased communication across the border.

The disease caused by metazoan parasites are, as a rule, intes-

tinal disturbances due to the presence of the parasites in the alimentary tract. There are one or two exceptions to this rule, notably the disease known as schistosomiasis, in which the parasites and their eggs are found in the blood vessels of the gastro-intestinal canal or of the genito-urinary organs, and the disease known as filariasis, in which the parasites are found in the lymphodes or the connective tissue in the various parts of the body. In filariasis the embryos are found in the circulating blood.

Many of these parasites gain entrance to the human body with food or drink, others require development up to a certain stage in intermediary hosts, still others gain entrance to the human body through the skin. Much work remains to be done on the life histories of many of these animals before definite knowledge of the manner of infection is to be had.

The trematodes are low forms of the natural order Vermes. With one exception they are hermaphroditic organisms which infect the various parts of the gastro-intestinal tract. One variety, which is indigenous to the Philippine Islands and other far Eastern countries, is found in the lungs. The parasites are not known to be indigenous to any part of the United States although it is not beyond the range of possibility that they may be represented in our home territory. However, climatic conditions are such in our lower austral zone that, provided suitable intermediary hosts are present, they may become established in this country. So far as we know, cleanliness in personal habits, care in the preparation of food, and abstention from eating uncooked fruit and vegetables are all that is necessary to prevent the spread of such infections.

Schistosomiasis is the disease produced by a trematode parasite, in which the male and female generative organs are contained in separate bodies. The disease is also known as bilharziasis. It is common in Egypt and in some other parts of Africa, and in Asia. A form of the disease has been met with in the West Indies and in some parts of Central and South America. The symptoms depend upon the location of the parasites and their ova. Sometimes an inflammation of the bladder results; in other cases the symptoms resemble those of dysentery. A variety of this infection is met with in China and Japan, one case of which has been imported into this country.

The cestodes are the tapeworms. Infection with these parasites

is by no means confined to the tropics or to subtropical countries; but in both these regions cestode infection is more common than in temperate climates. Nearly all of these parasites depend for their development in man upon the eating of insufficiently cooked meat. The inspection of our abattoirs by the officials of the United States Department of Agriculture prevents the marketing of infected meat, and is a public health measure of the first order. The proper cooking of meat is further responsible for the rarity of the occurrence of these worms in Americans.

The nematodes are the round worms. Infection with one of these is fairly common even among the children of the better class. Infection with the hookworm, *Necator americanus*, has been shown within the past ten years to be very common in the Southern states. Trichiniasis, infection with *Trichina spiralis*, is seen in rare cases. Filarial infections have been reported in our home territory. Prevention of these infections varies with the individual parasite.

*Ascaris lumbricoides* infection is to be prevented by teaching children to be careful of the things which they put into their mouths. We do not know the life history of this parasite, but infection appears to be the result of taking the embryos or the ova into the digestive tract.

Hookworm disease, uncinariasis, is a serious problem in our Southern states. The embryos develop in moist, sandy soil, and gain entrance to the body through the skin. The wet sand adheres to the skin of the legs and feet, and the embryos burrow into the underlying tissues and finally reach the intestine by a circuitous route. The disease has long been known in Egypt and other parts of the tropics of the Eastern Hemisphere as anchylostomiasis. It was a serious public health problem during the construction of the St. Gothard Tunnel, in 1880. Our army medical men found it in Puerto Rico, and subsequently the parasites were discovered in the South. Its presence results in a severe anemia which may be fatal. The prevention of the extension of the disease can be accomplished by the prohibition of soil pollution and by educating the people to wear shoes. In many localities the inhabitants are too poor to buy shoes. In such circumstances prevention of indiscriminate soil pollution is first in order. The amelioration of poverty, on the other hand, so that each individual can obtain enough

compensation for his work to be able to buy shoes for his family is a question for the political economist and the tariff commission.

It has been found in Puerto Rico that in cases of certain ladies of the better class who harbored *Necator americanus*, the infection had occurred through the skin of the hands from working in flower gardens, the soil of which had been fertilized by human feces. It has also been suggested that uncinariasis was one of the causes of the high morbidity and mortality among the Union prisoners in Confederate prisons from 1861 to 1865, particularly in Andersonville.

The Rockefeller commission will undoubtedly succeed in banishing this infection from our Southern States. It must, however, prosecute a long campaign of education before it can improve the sanitary conditions in the rural districts and inculcate new habits of personal hygiene in the inhabitants.

In filariasis the adult parasite inhabits the lymphnodes and the connective tissues. The embryos circulate in the peripheral blood. The presence of these parasites excites a train of diseases, the best known of which is elephantiasis. The disease is present in certain of the West India Islands. The embryos are taken into the stomach of a female mosquito and undergo a metamorphosis in the thoracic muscle of the insect. After the change in the embryos is completed, they migrate to the proboscis of the mosquito and are inoculated into the new individual by the bite of the insect.

Whatever of danger there may be in the importation of filariasis into the United States is to be obviated by a mosquito campaign. In this infection the intermediate host is not only the mosquito of the subfamily Anophelinæ but also certain species of the subfamily Culicinæ. The culex mosquito will breed in any kind of water, some species developing in almost pure filth. Consequently, it is not only necessary to drain marshes and to clean out streams, but also to dispose of all collections of still or stagnant water; the water in flowerpots in cemeteries, in discarded tin cans, in broken bottles, drains, cisterns, etc., has been found swarming with culex larvæ. The collections of water in the hollow branches and the trunks of trees, and in the corollas of many plants, such as the pitcher plant, have been found to be breeding places for these insects. There is no danger of the direct transmission of filarial infection from man to man.

Of the diseases due to bacteria, plague is the one of most



interest to the American health officer. The disease is due to an organism known as *Bacillus pestis*. Through the work of the English Plague Commission, done in Bombay and its environs, it has been definitely established that the disease is originally one of rats and mice and that it is carried from rat to rat by the bites of infected fleas. After the rat population of a city has been reduced by the epizootic, the fleas, no longer finding sufficient animal food, turn their endeavors to and become temporary ectoparasites of man. The epidemic then spreads from man to man by the bites of infected fleas. In a few cases, about one per cent in a large epidemic, the disease exists in man as a pneumonia excited by the *Bacillus pestis*, and this form of the infection is transmissible from man to man directly by infected sputum, which is disseminated by coughing, and by soiled bed linen and personal linen.

In the prevention of an epidemic of plague, the destruction of rats and mice, is the important sanitary problem. The isolated patient is not dangerous provided he is not suffering from the pneumonic form of the disease. Plague has been present in San Francisco twice within the past ten years. In 1900 the business men and health officials of San Francisco and California made a serious blunder in denying the existence of the disease, and, by their attitude, causing the resignation of an officer of the United States Public Health and Marine-Hospital Service who was eminently equipped for coping with the situation. As a result, the disease ran for a period of two or three years with occasional cases reported, and the rat population of San Francisco became generally infected so that in 1907 plague again appeared in that city. This time, however, profiting by the former error, the health authorities of California and of San Francisco summoned the federal authorities to their aid and, by placing the matter entirely in the hands of the latter, had the satisfaction of seeing the epidemic stopped in eight months with a total of 160 cases and 78 deaths. Fifteen cases occurred in Oakland and Seattle with 10 deaths. During this period the Public Health and Marine-Hospital men were killing 10,000 rats a week, about three per cent of which were found infected with *Bacillus pestis*. The officers in charge of the work further developed the fact that the wood squirrels about Oakland were infected with plague, and measures have been taken to destroy these rodents.

The destruction of rats in our seaports is a problem that should at once receive attention from the proper sanitary authorities. A ship coming from a plague port with infected rats in its hold should be so moored that these animals cannot get ashore. For this purpose rat guards have been devised for the purpose of preventing the rodents from leaving the vessel at night by way of the hawsers, and starting an epizootic among the rats on land. Once started in New York or Philadelphia these cities would pass through an experience similar to that of San Francisco. The rat population is ready to hand, the rat flea is ready with his host, and the climatic conditions from May to October are suitable.

No advantage except a temporary one, is ever gained by denying the existence of an epidemic in any city. The hiding of the facts gives a chance for the disease to gain headway and to result finally in a greater loss to business and a more appalling loss of life than though the disease were admitted to exist from the beginning and proper prophylactic measures immediately instituted.

Cholera is due to the *Bacillus cholerae*. It is a water-borne disease, the infected individual polluting the water supply by improper disposition of his feces. Flies are sometimes responsible for epidemics by first alighting on objects contaminated with the bacilli and then alighting upon exposed food stuffs. It is hardly to be conceived that an epidemic of this disease should start in any of our American cities. The quarantine officers are constantly on the lookout for cases of intestinal disturbance in immigrants from parts in which cholera exists, as well as in the members of the crews of the vessels.

In Mohammedan countries many pilgrims returning from Mecca bring holy water with them from the Holy City. In order to give all the faithful an opportunity to benefit from the water, the contents of the bottle are emptied into the well or other source of water supply of the village to which the pilgrim belongs. Since the holy water frequently contains cholera bacilli, an epidemic results. With the increasing Mohammedan population of the Pacific coast this is a problem that may confront our health officers in the future. Infection of the individual is to be prevented by boiling the drinking water, by abstaining from the use of uncooked foods, and by care in the production of the milk supply. The house fly should not be neglected. The patient is not dan-

gerous provided his intestinal and other discharges are properly sterilized before being consigned to the cesspool or sewer. Burning is the most efficacious method of disposing of infected human feces.

Dysentery, except the amebic form, already referred to under the head of amebiasis, is due to *Bacillus dysenteriae*. The epidemics are of minor import, so far as they have occurred in our own land. In the tropics and in subtropical countries, where the climate is depressing and where the poorer classes are more constantly underfed and overworked than with us, the disease often assumes serious proportions. It is water-borne and requires the same preventive measures that apply to cholera. The fly problem is important in its relation to this infection.

Malta fever is caused by the *Micrococcus melitensis*. Cases of the disease are found in the Mediterranean littoral in greatest numbers. Cases have been found in Cuba and Puerto Rico, Central and South America, and it is not beyond the range of possibility that cases occur along the United States shores of the Gulf of Mexico. In Malta, the disease is supposed to be transmitted by drinking the milk of infected goats; these animals supplying the milk for the inhabitants of the island. The disease is not very severe and the death rate is small, about three per cent. It is responsible, however, for a large amount of invalidism. The problems to be solved in case it should ever be found in our country are entirely hypothetical.

The attitude of the public toward leprosy is a blot upon our civilization. The disease is caused by the *Bacillus lepræ*. It is not, strictly speaking, a tropical disease, Norway and Iceland being countries in which it is indigenous. It is transmitted only by very intimate personal contact. The patient is not a danger to the community in which he dwells, unless it be proved that the suspicion, now entertained, that the organism is transmitted by the bites of infected bedbugs is warranted. Even then cleanliness is the answer to the public health question involved. The segregation of lepers in colonies is advisable on account of the repulsive nature of the deformities seen in the advanced cases; but not because there is any fear of an epidemic.

Leprosy is endemic in many Central and South American States. There is a leper colony in Louisiana. It is common in

the Hawaiian Islands, in China, in Japan, and in the Philippine Islands. The treatment of the unfortunate victim of this disease who was discovered in a village in Maryland about two years ago is shameful, productive of no good to the general public, and an insult to twentieth century knowledge.

Of the diseases of unknown etiology, yellow fever has been our most serious tropical problem. The disease is endemic in Cuba and in Brazil and has frequently been seen in epidemic outbreaks in our Southern states and in Central and South America. Some cases have been seen on the west coast of Africa, and epidemics have occurred in the past in Philadelphia, New York, and Baltimore.

The work of the Yellow Fever Commission of the United States Army in Havana, in 1900, has proved that the disease is transmitted by the bite of infected *Stegomyia calopus* mosquitoes. The problem of prevention of epidemics, therefore, resolves itself into the destruction of *Stegomyia calopus*. This was successfully demonstrated in New Orleans in 1908. *Stegomyia calopus* apparently always breeds in artificial collections of fairly clean water. Consequently the screening of cisterns, wells and reservoirs is absolutely necessary. The patient must be treated in a ward or an apartment screened from the access of mosquitoes, and the apartment from which he was removed at the onset of the disease must be fumigated for the purpose of killing what adult mosquitoes may be contained in it; but for no other reason. The patient is harmless, except he is bitten during the first three or four days of his illness.

The American people owe a debt of gratitude to Dr. James Carroll, Dr. Walter Reed, Dr. Jesse Lazear, and Dr. Aristides Agramonte which pensions and monuments can but partially repay. It is a parsimonious congress indeed that will neglect the widows of Dr. Carroll and Dr. Reed while it corrects the military records of patriotic deserters.

Dengue is frequently met with in epidemic form in the Southern United States and in the West Indies. It is a considerable factor in morbidity statistics in the Philippine Islands. It is met with in many tropical and subtropical countries. It is not dangerous to life, the death rate being less than one per cent, and the fatal cases being seen in individuals who were already suffering from some chronic complaint when attacked by dengue. Our knowledge of

the transmission of dengue is due to the work of the United States Army Board for the study of tropical diseases as they occur in the Philippine Islands, Dr. P. M. Ashburn and Dr. Charles F. Craig. These investigators, following the methods pursued by the Yellow Fever Commission in Cuba, have demonstrated the transmission of the disease by the mosquito *Culex fatigans*. The prevention of epidemics of dengue is a question of mosquito extermination.

Beriberi is a disease indigenous to China, Japan, the Philippine Islands, the Malay Peninsula, and India. It is characterized by an acute febrile period, followed by dropsy, and later, by paralysis. The cause of the disease is unknown. The majority of students of tropical pathology are of the opinion that it is the result of the consumption of spoiled rice. Some few observers believe it to be dependent upon an unknown parasite.

The presence of a case of beriberi upon a vessel from an Indian, a Chinese, or a Japanese port is no excuse for scareheads in the newspapers. It is perfectly safe to treat such a patient in the general wards of a New York hospital.

*Conclusion.*—It is no part of the intention of the writer of this paper to increase the causes of uneasiness of certain susceptible individuals among his countrymen. The knowledge that certain diseases exist, that they have well known causes, that they are disseminated by well understood agents, and that their spread can be prevented by well tried methods, should make for peace of mind rather than for worry. A man who is on his way home at night will not fall into the ditch, provided he knows where the ditch is. The knowledge of the existence of an epidemic disease is the most important element of the campaign to eradicate the disorder.

The application of the various sanitary methods referred to in the course of this paper is of the first importance wherever men are gathered together. We are fairly well informed as to the value of a noncontaminated water supply, of a clean milk supply, of clean streets, of proper garbage and sewage disposition. All these things cost money, but we now know that the money is well spent. Campaigns of mosquito extermination, of fly destruction, of rat and mouse extirpation will be found to be investments that will pay.



In the Nobel Lecture at Harvard on December 14, 1910, ex-President Roosevelt said:

Many men have rendered high and honorable service to the United States in connection with the work of the Panama Canal, but by far the greatest and most important work has been rendered by Colonel Goethals. It is to him more than to any other one man that we owe the successful accomplishment of one of the great business and engineering feats of all the ages.

When it is completed, Colonel William C. Gorgas will have made possible "more than any other one man" the construction of the Panama Canal. The Canal would have been a French achievement, had it not been for yellow fever and malaria. Whatever of dishonesty in affairs may have existed in the French company was of small import beside these two tropical diseases. Shoulder straps have never prevented the bite of a malaria carrier, nor of a yellow fever carrier.

[NOTE.—The author would acknowledge his indebtedness to Mr. George S. Bliss, of the Philadelphia office of the United States Weather Bureau, for valuable help concerning the climatological data herein contained.]

## THE HOUSE FLY AS A CARRIER OF DISEASE

BY EDWARD HATCH, JR.,

Chairman, Fly-Fighting Committee, American Civic Association, New York.

The common house fly has been a follower of mankind since the beginning of history, as doubtless he was for ages before. He is found only where man has made his home; and the newest pioneer settlements soon have a fly population proportionately larger than the older communities. The Egyptian plague of flies is recorded in the Book of Exodus in terms which indicate that the author of the Pentateuch looked upon these insects as something more than mere nuisances; for he says: "The land was corrupted by reason of the swarm of flies" (Ex. viii. 24); and their potentialities for evil were more than hinted at in the name of the Canaanite god Baal-Zebub (Prince of Flies), which in the religious language of a later day became an alternative term for the devil himself.

While the sacred writers seem to have had some appreciation of the pestiferous nature of the fly, references to him in modern literature have been usually of a sportive and flippant character; he has been either the subject of jests or a symbol of weakness and harmlessness. Children have been taught that they must save the interesting little creature when he seems likely to drown in a mug of milk. It is only comparatively recently that he has been revealed in his true colors and shown to have earned the title of "the most dangerous animal on earth."<sup>1</sup>

When the Water Pollution Committee of the New York Merchants' Association was founded a few years ago, one of the first questions for its consideration was the menace to health constituted by the pollution of New York Harbor—a menace whose existence had been denied by certain scientific authorities. The committee therefore made an investigation of the conditions prevailing along the waterfront of Manhattan Island, and proceeded to show the relation between them and the death rate of the districts in the immediate neighborhood of the docks. Dr. Daniel D. Jackson, who conducted the investigation as a member of the com-

<sup>1</sup> Daniel D. Jackson in "The House-Fly at the Bar."

mittee, finding that flies, attracted by the dry and floating sewage in slips and on the wharves, swarmed along the waterfront, set a large number of traps at different points on the North and East river shores. Counting the flies every day, he grouped his results by weeks, thus allowing for both sunny and rainy days. His captives carried innumerable fecal bacilli on their legs and bodies—one fly, taken in South street, having more than 125,000 about him. He found that the increase in the number of such intestinal diseases as typhoid fever and the summer diarrhœa of infants was in direct proportion to the increase in the number and activity of flies. He presented with the report a map of the Borough of Manhattan, with cases of typhoid and intestinal diseases indicated by black dots, by which it was shown that the vast majority of these cases were to be found in the parts of the city nearest the polluted waterfront. A thoroughgoing reform of general sanitary conditions in the districts affected, including the adoption of some system of sewage disposal, would, the report stated, reduce the yearly typhoid deaths in New York very considerably, and the diarrhœal deaths from 7,000 to 2,000—if germ-infected flies were not permitted to contaminate the milk supply before it reached the city or after. In addition to the lives thus saved, the reforms recommended would reduce the number of cases of illness from these causes about 50,000 annually.

The Jackson report, published by the committee under the title "Pollution of New York Harbor as a Menace to Health by the Dissemination of Intestinal Diseases through the Agency of the Common House-Fly" (December, 1907), was widely circulated, and is perhaps the best known record of experiments tending to establish the responsibility of flies for the spread of disease-producing bacteria. Confirmatory testimony is furnished by many other authorities, as the result of investigations carried on in various parts of the world, so that we need no longer speak of an hypothesis of disease transmission by flies, but may regard the fact of such transmission as scientifically established. I shall in this paper adduce only a small part of the great body of testimony, before proceeding to the discussion of the means which to me as a layman—but a layman who has given much time and attention to the problem—seem most likely to accomplish the extermination of the pest. I may say in passing that, though to the readers of THE

ANNALS it is not necessary to apologize for the plain treatment of the disagreeable phases of the subject, such treatment is sometimes offensive to over-sensitive members of a popular audience, as the committee has more than once found to its sorrow—as when in a city in Indiana the authorities forbade the showing of its moving pictures illustrating the dangers of the fly nuisance, on the ground that they were too disgusting to be presented in public.

A little more than a year ago, Dr. L. O. Howard, Entomologist of the United States Department of Agriculture, proposed the name of "typhoid fly" as a substitute for that of "house fly," commonly used to designate *Musca domestica*. His suggestion, while it has not actually changed current nomenclature, has been so widely commented upon that it has accomplished much in the way of impressing the popular mind with the fly's dangerous activities. With true scientific conscientiousness, Dr. Howard explained that, "strictly speaking, the term is open to some objection, as conveying the erroneous idea that the fly is solely responsible for the spread of typhoid; but considering that the creature is dangerous from every point of view, and that it is an important element in the spread of typhoid, it seems advisable to give it a name which is almost wholly justified and which conveys in itself the idea of serious disease."

There is little danger that any other fly may be made by indignant housewives or health officers to suffer for the sins of *Musca domestica*, for this variety constitutes ninety-eight per cent of the fly population of American houses. A condensed account of its habits<sup>2</sup> will suffice to indicate the ways in which it may carry germs from filth to human food.

Born in manure, generally that of the horse, or in decomposing matter of any kind, vegetable as well as animal, they enter our homes to alight on foods there stored. Their tastes are indelicate and omnivorous; but they subsist on sputum, fecal juices, and the slime and dirt that sticks to exposed surfaces. Their proboscides, through which they feed, are connected with an extremely active salivary gland, capable of pouring out a large quantity of saliva, which the fly projects against a dry surface, swallowing the subsequent solution. Naturally, solid particles, living organisms, parasites, and eggs, small enough, may pass into the digestive tube. Bacilli of different types and eggs of the nematodes have been observed in the

<sup>2</sup> As given by Dr. Gordon K. Dickinson, in the New York "Medical Record," January 26, 1907.

proboscides, stomach, intestinal tract and dejections. The time that particles remain in the digestive tract of the fly is from twelve to twenty-three days. Evidently the digestive secretions are not active for harm, as organisms will not only pass through alive, but increase in number while in transit. There must be some absorption of the toxins of bacilli, for flies die in large numbers which have had the fortune to imbibe such bacilli as those of the plague and anthrax. Flies are large breeders, lay their eggs by preference in horse manure, but also in decaying meat, meat broth, cut melons, dead animals, and even in cuspidors. On these substances their larvæ subsist until they hatch. From ten days to two weeks after the time the eggs have been laid the fly is fully hatched. It is estimated that one fly, laying 120 eggs at a time, will have a progeny amounting up to the sextillions at the end of the season.

The earliest convincing evidence of the part played by house flies in the dissemination of the typhoid bacillus was furnished by Drs. Vaughan, Veeder, Reed, Sternburg and Shakespeare, who investigated camp conditions during the Spanish-American War. Dr. Vaughan, a member of the U. S. Army Typhoid Commission of 1898, summarized his reasons for believing that flies were active in the dissemination of typhoid fever in these paragraphs:<sup>3</sup>

(a) Flies swarmed over infected fecal matter in the pits and then visited and fed upon the food prepared for the soldiers in the mess-tents. In some instances where lime had recently been sprinkled over the contents of the pits, flies with their feet whitened with lime were seen walking over the food.

(b) Officers whose mess-tents were protected by screens suffered proportionately less from typhoid fever than did those whose tents were not protected.

(c) Typhoid fever gradually disappeared in the fall of 1898 with the approach of cold weather and the consequent disabling of the fly.

It is possible for the fly to carry typhoid bacillus in two ways. In the first place fecal matter containing the typhoid germs may adhere to the fly and be mechanically transported. In the second place, it is possible that the typhoid bacillus may be carried in the digestive organs of the fly and may be deposited with its excrement.

The observations and deductions of American surgeons were corroborated by the British medical officers in the Boer War. "Nothing," says Dr. Dunne, writing in 1902, "was more noticeable than the fall in the admissions from enteric (typhoid) fever coincident with the killing off of the flies on the advent of the cold

<sup>3</sup> "Conclusions Reached After a Study of Typhoid Fever Among American Soldiers." A paper read before the American Medical Association, 1900.



nights of May and June. In July, when I had occasion to visit Bloemfontein, the hospitals there were half empty and had practically become convalescent camps."

That the conditions which prevailed in military camps before the deadly work of the fly was recognized are to be found in many communities in time of peace, and that their agency in spreading disease is equally effective, may be seen—to select only one from numerous instances—from the report of Dr. Alice Hamilton on the typhoid fever epidemic in Chicago in July-September, 1902. Two places in the neighborhood of Hull House were selected as especially favorable for an investigation of the relations between flies and the epidemic.

The first was an unconnected privy on Polk street, into which the discharges from two cases of typhoid fever were being thrown without any attempt at disinfection. The vault was either very shallow or very full, for the dejecta lay within three feet of the opening and had caught on the projecting scantling within a foot of the opening. The flies caught within the vault, on the fence of the yard, and inside the sickroom of one of the patients, which was also used as a kitchen, were dropped into test tubes containing culture medium and allowed to remain there for periods varying from fifteen minutes to twelve hours, and were taken to the laboratory of the Memorial Institute for Infectious Diseases for examination. The full details of this part of the investigation have been published in the "Journal of the American Medical Association." In two of the tubes, the one from the sickroom and the one from the yard, the typhoid bacillus was discovered. In one of the tubes inoculated by flies from the vault a bacillus was discovered closely related to but not identical with the typhoid bacillus, belonging apparently to the group intermediate between the typhoid and colon groups. This is a group of bacilli which have been isolated from patients suffering from typhoid-like affections.

The second place chosen was a yard on Aberdeen street, containing one large, full and filthy vault, not connected with the sewer. This is used by sixteen families. Flies from three privies built over this cesspool were used to inoculate four tubes. Other flies from the fence of the yard and from the walls of the two houses bounding the yard at varying distances from the vault were dropped into six tubes. In three of these tubes the typhoid bacillus was discovered.

Further bacteriological evidence of the transmission by flies of the typhoid bacillus is adduced by Dr. C. Gordon Hewitt,<sup>4</sup>

<sup>4</sup> In "The Structure, Development and Bionomics of the House-Fly, *Musca domestica*, Linn. Part III. The Bionomics, Allies, Parasites, and the Relations of *M. domestica* to Human Disease."

Dominion Entomologist, of Ottawa. He records the recovery by Celli (1888), of the *Bacillus typhi abdominalis*, from the dejections of flies which had been fed upon cultures of the same, and his proof that the bacilli passed through the alimentary tract in a virulent state. Ficken, in 1903, found that "when flies were fed upon typhoid cultures they could contaminate objects upon which they rested. The typhoid bacilli were present in the head and on the wings and legs of the fly five days after feeding, and in the alimentary tract nine days after."

Flies also certainly transmit, according to Dr. Hewitt, and other scientific investigators, the bacilli of tuberculosis, cholera, anthrax, bubonic plague, and possibly those of ophthalmia and one or two more loathsome diseases. But if we confine our consideration to its connection with typhoid fever alone, we must hold the fly responsible for a large proportion of the vast money loss which this country annually suffers from the ravages of that disease. Dr. G. N. Kober, of Washington, has estimated that the decrease in the vital assets of the United States through typhoid fever in a single year is more than \$350,000,000. Physicians are not unanimous as to the proportion of responsibility for typhoid which must be assigned to flies, polluted water and infected milk, but most of them agree in crediting flies with a very important part in its dissemination; and when to this vast sum is added the \$10,000,000 which the people of this country pay annually for screens to protect themselves against flies and mosquitoes, we have what should be a tremendously effective argument in favor of the extermination of the fly pest—even without the infinitely more potent appeal, if it could be made personal, to each of us to guard the health and lives of ourselves and our families.

For the fly plague is not one which must be endured as a visitation of Providence. It may be stamped out by the systematic adoption of one method, and only one, by the individual and the public—the method of cleanliness. The fly is bred in, lives and thrives upon, filth. If you allow no filth to accumulate in your house and your neighborhood, you will not be troubled by flies, for they do not, ordinarily, stray far from their breeding places and their sources of food supply. Even if they should enter a thoroughly clean neighborhood, they could not exist in the face of screens preventing their access to food and in the absence of

manure heaps and other receptacles of filth in which to deposit their eggs. Those who conduct local campaigns against the house fly cannot too strongly emphasize the dictum of the Fly-Fighting Committee of the American Civic Association, "If there is no filth there will be no flies."

One result of the investigations made by Dr. Jackson into the relations existing between flies and sewage was the prosecution, at first within the Water Pollution Committee of the New York Merchants' Association, and later through a special committee of the American Civic Association, of a campaign of education and extermination directed against the fly. A summary of the activities of this committee will furnish suggestions for those who desire to co-operate in the general reform through local organized effort.

The committee, as now constituted, is somewhat larger than in the period of its connection with the Merchants' Association, and most of the members of the Water Pollution Committee, in which it had its beginnings, are members of the new committee (formed in February, 1910). This close association of the two committees is appropriate, for nearly everywhere—in the small towns perhaps more even than in the great cities—untreated and unprotected sewage makes the banks of watercourses the gathering and breeding-places of flies. The membership of the Fly-Fighting Committee is as follows: Edward Hatch, Jr., of New York, chairman; Dr. Daniel D. Jackson, Dr. Woods Hutchinson and Col. John Y. Culyer, of New York; Harlan P. Kelsey, of Salem, Mass.; Mrs. Caroline Bartlett Crane, of Kalamazoo, Mich.; Dr. S. J. Crumbine, State Commissioner of Health, of Topeka, Kan.; Dr. Joseph Y. Porter, State Commissioner of Health, of Jacksonville, Fla.; Dr. Albert VanderVeer, of Albany, N. Y.; Mrs. R. S. Bradley, of Boston, Mass.; Miss Alice Lakey, of the Food Committee of the National Consumers' League, of Cranford, N. J., and Mrs. Gardner Raymond, of Rochester, N. Y.

Each member of the committee is a center for his or her part of the country—and the members are pretty widely distributed, geographically—for the dissemination of educational literature bearing upon the subject of flies, and so well has the work been done that very few people who read the newspapers can plead ignorance of fly dangers as an excuse for not excluding the pest from their neighborhoods and their houses. The committee sends free to phy-

sicians, health officers, teachers, social workers—in fact to any one who expresses an interest in the subject—such literature, prepared under its direction, as “The House-Fly at the Bar” (a compilation of scientific opinions, popularly expressed, as to the fly’s guilt in the matter of disease dissemination); “Rules for Dealing with the Fly Nuisance” (for posting in hotels, schools, factories, stores, etc.), and “Beware of the Dangerous House-Fly” (a simply-worded tract for popular distribution, particularly among school children). One of the most effective and popular means of bringing home to the average person what it means to allow the fly to flourish and have free access to houses and food is the moving picture film, entitled “The Fly Pest,”<sup>5</sup> made in Europe under the auspices of a representative of the committee, which has been shown in hundreds of moving picture halls and is still a “drawing card.” The series of pictures shows flies (as big as Plymouth Rock hens, as they appear on the screen) laying eggs in filth; the eggs in white masses; the maggots in writhing heaps as they emerge from the eggs, and in different stages of their growth as maggots, until they burrow in the dirt to enter the pupa state; the pupæ (or grubs) themselves, one day later; flies emerging from the filth, at first wingless; then the perfect adult fly. Then follow pictures stretching across the screen, of a fly taking a sip of honey from the point of a needle, showing the action of the proboscis, very like an elephant’s trunk in miniature; of the tongue, and of the foot, also enormously enlarged, and with every microscopic hair distinct.

The second act of this little life history is entitled “How Flies Carry Contagion.” In it these scenes follow one another in rapid succession, so that the most thoughtless spectator cannot fail to grasp their full significance: flies swarming over putrid fish; crawling over lumps of sugar; in a cuspidor; on the nipple of a baby’s feeding bottle, and, last of all, a pretty baby placidly sucking the mouthpiece from which the flies have just departed.

The usefulness of this method of propaganda is shown by the action of Dr. W. A. Evans, health officer of Chicago, who has been giving free lectures on the fly pest in the moving-picture theatres in that city. All over the country there has been gratifying co-operation in this educational work between enlightened moving-

<sup>5</sup> Controlled by the Kleine Optical Company, Chicago, Ill.



picture showmen and the various agencies working for fly extermination.

Lantern slides illustrating the same subject as the film, to be used in lectures for which moving pictures are not available, are loaned to responsible persons who make application to the committee. A traveling exhibit, consisting of photographs illustrating and placards warning against the fly pest, is also to be had by local organizations which guarantee to pay express charges and to return it intact. The pictures and placards are mounted on a folding screen, about six feet high, and the whole exhibit may be packed snugly in a substantial wooden box which accompanies it.

The committee plans this year (1911) to extend its educational campaign among the school children, and to this end has instituted a system of prize competitions in essay writing on the subject, "The House Fly as a Carrier of Disease." The pupils of the public and parochial schools taking part in these competitions will be supplied with the material for their essays, contained largely in the "literature" to which reference has already been made.

Another line of work has been projected, namely, the preparation of a "white list" of hotels and summer resorts that take proper precautions against the fly pest; information being solicited from all members of the American Civic Association.

Now for a few practical suggestions as to the means of exterminating the pest. Dr. Howard says:

Even if the typhoid or house fly were a creature difficult to destroy, the general failure on the part of communities to make any efforts whatever to reduce its numbers could properly be termed criminal neglect; but since it is comparatively an easy matter to do away with the plague of flies, this neglect becomes an evidence of ignorance or of a carelessness in regard to disease-producing filth which to the informed mind constitutes a serious blot on civilized methods of life.

The methods of ridding a neighborhood of flies are, as Dr. Howard has intimated, comparatively simple, or would be so, at any rate, to a fly-fighter with despotic power over a community. For to insure the success of this work co-operation is absolutely essential. One carelessly conducted stable may nullify the conscientious efforts of a whole neighborhood of fly-fighters, although they always have the resource of bringing moral suasion to bear upon the proprietor of that stable. But while the creation of a



proper community spirit is necessary—a spirit which shall bring home to each householder his responsibility for maintaining sanitary conditions on his premises—the benevolent despotism of the health officer is the most effective single agency for carrying out the reforms for which this committee is striving. Fortunately, the great majority of health officers are so thoroughly alive to the dangers of the fly pest that they are at least willing to enforce any fly ordinances which public opinion is strong enough to have enacted, even if they are not, as they generally are, pioneers in the anti-fly movement.

Such pioneers are the members of the Indiana State Board of Health, who have framed and sent to the mayors of all the cities in the state the following ordinance:

WHEREAS, It is commonly known that flies are very dangerous carriers of filth, filth poisons, and disease germs, that they are born in filth, and are a constant threat against the health, happiness and prosperity of the people; therefore,

SECTION 1. Be it ordained by the Mayor and Council of the city of ———, that it shall be unlawful for any person, firm or corporation to suffer or permit or have upon their premises, whether owned or leased by them, any one or more of the following unsanitary fly-producing, disease-causing conditions, to wit: (1) Animal manure in any quantity which is not securely protected from flies; (2) privies, vaults, cesspools, pits or like places, which are not securely protected from flies; (3) garbage in any quantity which is not securely protected from flies; (4) trash, litter, rags or anything whatsoever in which flies may breed or multiply.

SECTION 2. It shall be the duty of the chief of police or city marshal and health officers, upon learning in any way whatsoever of the existence of one or more of the unlawful conditions described in Section 1 of this ordinance, to notify the offender in writing, upon order blanks provided by the city clerk, to remove or abate said unlawful conditions, stating the shortest reasonable time for such removal or abatement. In the event of the refusal or neglect on the part of the notified offender to obey such order, the chief of police or health officer shall inform the street commissioner, upon a blank provided by the city clerk, and it shall then be the duty of said street commissioner, and he shall have power and authority, to remove and abate the reported unlawful conditions; and he shall keep an accurate account of the cost and expenses thereof, which shall be paid from the city treasury upon the sworn vouchers of the street commissioner, and said cost and expenses shall be a lien upon the property and shall be collected by law as taxes are collected and duly paid into the city treasury.

SECTION 3. Any person, firm, or corporation found guilty of having created or suffered to exist on premises either owned or leased by them

any one or more of the unlawful conditions named in Section 1 of this ordinance shall be punished by a fine of not less than five or more than fifty dollars.

SECTION 4. All ordinances or parts of ordinances in conflict with this ordinance are hereby repealed; and whereas an emergency exists, this ordinance shall be in effect upon and immediately after its passage.

This draft of a proposed ordinance, which I consider admirable as directing attention to filth as the sole cause for the existence of flies, has been copied by the Kansas and California boards of health and extensively circulated in those states. I hope the time may soon come when we shall see every city with such an ordinance rightly enforced.

The "Rules for Dealing with the Fly Nuisance," circulated by this committee, are as follows:

Keep the flies away from the sick, especially those ill with contagious disease. Kill every fly that strays into the sickroom. His body is covered with disease germs.

Do not allow decaying material of any sort to accumulate on or near your premises.

All refuse which tends in any way to fermentation, such as bedding straw, paper waste, and vegetable matter should be disposed of or covered with lime or kerosene oil.

Screen all food whether in the house or exposed for sale.

Keep all receptacles for garbage carefully covered and the cans cleaned or sprinkled with oil or lime.

Keep all stable manure in vault or pit, screened or sprinkled with lime, oil or other cheap preparations, such as are sold by a number of reliable manufacturers.

See that your sewage system is in good order; that it does not leak, is up to date, and not exposed to flies.

Pour kerosene into the drains.

Burn or bury all table refuse.

Screen all windows and doors, especially in the kitchen and dining-room.

If you see flies you may be sure their breeding place is in nearby filth. It may be behind the door, under the table or in the cuspidor.

If there is no filth there will be no flies.

If there is a nuisance in the neighborhood write at once to the health department.

#### TO KILL FLIES

The London "Lancet," the leading medical journal of the world, says that the best and simplest fly-killer is a weak solution of formaldehyde in water (two teaspoonfuls to the pint). Place in plates or saucers throughout

the house. Ten cents' worth of formaldehyde will last an ordinary family all summer. It has no offensive smell, is fatal to disease organisms, and is practically non-poisonous except to insects.

Pyrethrum powder, which may be bought at any drug store, burned in the house, will also kill flies.

These rules go further than the Indiana ordinance in including directions for screening houses and food, and I believe cover all practical points. At any rate, with these and the ordinance enforced in any community I should be willing to take all the chances of disease transmitted by flies that might be afforded me.

No enthusiast in the movement for the extermination of the fly should delude himself with the belief that the end he seeks is to be attained with ease. To be sure, the replacing of the horse by the automobile makes the city streets less inviting to flies; and as they are not given to flying more than eight feet high, our sky-scrapers are in great part free from them; nevertheless, we cannot hope that the mere advance of invention will rid us of the plague. It is easy and simple to say, "If there is no filth there will be no flies;" and it is a comparatively simple thing to order one's own house that flies shall have no breeding place in and immediately about it; but to insure the same care on the part of one's neighbors and the general public is the difficulty. Hence the necessity for organization to educate the public to a realization of fly dangers and to build up a body of public opinion which will make possible the enactment and enforcement of such measures as I have recommended. In such educational movements the newspapers and the press generally will be found able and willing co-workers; I recommend all fly-fighters to secure their powerful support at the outset of the campaign. And to any readers in whom this paper may have aroused an interest in this very important subject I promise, on behalf of the Fly-Fighting Committee of the American Civic Association, all the additional information and assistance at its command.

## THE MOSQUITO CAMPAIGN AS A SANITARY MEASURE

BY JOHN B. SMITH, SC.D.,  
State Entomologist of New Jersey.

Insects as factors in sanitary work have been very little regarded until recent years and, practically, only since it was demonstrated that mosquitoes of certain species were necessary intermediate agents in the transmission of certain febrile diseases. The history of that demonstration has been well written by Howard, Blanchard, Theobald and others, and need be only referred to here. Since that time, attention having been directed to the class, certain ticks, lice, fleas and flies have been convicted as carriers or transmitters of a variety of diseases of man and other animals, and this branch of entomological research has become of the highest practical importance.

To emphasize the agency of one of the carriers, Howard has proposed that the common house fly be hereafter known as the typhoid fly and, while there are objections to the name, it is not inadvisable to follow him; remembering the while that it is really only a typhoid fly, and not the only species capable of carrying the morbid organism. Nor is its ability as a carrier confined to typhoid or even enteric diseases. Any pathological germ, microbe, bacillus or other creature capable of being taken up and carried from one place to another may be transported by this omnipresent pest, and the comma and colon bacillus are equally liable to be ingested and again discharged in virulent condition.

There are the radical differences between a transmitter and a carrier of a disease "germ," for a transmitter is usually agent for one parasitic organism only, while a carrier may transport a number. *Stegomyia calopus* is a transmitter of yellow fever only and, so far as our knowledge extends at present, the only transmitter of that disease. Certain species of *Anopheles* are transmitters of the various forms of malaria and, so far as we know, the only transmitters of those diseases. Eliminate *Stegomyia* and *Anopheles* and at the same time yellow and malarial fevers have been disposed of; but even if every house fly could be at one blow destroyed,

typhoid, cholera and other enteric fevers would yet continue to exist and would even appear in epidemic form when conditions favored.

It is matter of interest also to note that by far the most important of the transmitters of disease belong to the order *Diptera* or two-winged flies, the most highly specialized of all the insect orders, and probably the most recent in point of development. I am not unmindful of the fact that mites and ticks are sources of danger and agents in the transmission of Texas fever in cattle and spotted fever in man; but as a general statement and applied to the true insects alone, the order *Diptera* contains the most dangerous of all our species from the sanitary standpoint.

Any effort to lessen or altogether eliminate any of the mosquito carriers of disease is therefore worthy of the support of sanitary authorities, whether national, state or municipal, and this fact has been recognized to the fullest extent by the United States Government authorities at work in the Panama Canal Zone.

A brief consideration of the life cycle of mosquitoes is desirable, to understand the extent and variety of work necessary in any comprehensive campaign, for while there are some similarities there are also many differences in habits and development. All mosquitoes are wrigglers in the larval stages, and all require water for development; that is the one feature identical in the life history of all the species so far as known to me. But there is the greatest divergence as to the kind of water preferred and in the conditions under which they occur. Some species breed only in woodland pools, some only on salt marshes, some only in tree holes filled with water, some only in the small collections of liquid found in pitcher plants and other water-storing plants, some only in clean water, while a few are specifically dirty-water mosquitoes. In the tropics the divergencies in breeding habits are still greater, but for my present purpose the consideration of species is confined to the types occurring in the Middle Atlantic states and immediately adjacent regions.

It is particularly to be noted in this connection that the dirty-water breeders are those most closely associated with man—*Stegomyia calopus* and *Culex pipiens* for instance—and are rarely if at all to be found far removed from his settlements. They have specifically adapted themselves to live in association with him and in the



liquid wastes that he produces. The larva of the house mosquito—*Culex pipiens*—lives indoors and out, in any receptacle containing water—a fruit jar, a flush tank or even an unused bowl of a water closet, in cesspools, manure pits, sewer catch-basins, gutters, etc. There is no liquid so filthy, so it be actually a liquid, as to daunt this species. And here comes a thought for those who consider the house mosquito leniently, as something to be philosophically endured because of the trouble and expense of dealing with him otherwise. The food of these wrigglers consists of the micro-organisms found in this waste and foul water—of the specific and morbid organisms from all the excreting organs of the human and animal body, of those producing ferments and decay and of about everything that the sanitarian deems most vile and objectionable—and this creature, so nourished and built up, has been and is allowed in our houses, allowed to feed upon our blood and upon that of our children, allowed to puncture the skin and inject into our veins the poisonous salivary secretions distilled out of all this refuse! Is it at all wonderful that sometimes a mosquito bite sets up serious disturbances even where pathological organisms are not carried! Strictly speaking, although it carries no specific disease, *Culex pipiens* is a greater nuisance than the malaria transmitting *Anopheles* because of its greater abundance, its wider range, its vicious bite and its more persistent efforts to get indoors and into our dwellings.

Now, while all mosquito larvæ or wrigglers are water dwellers and feeders upon minute or other organisms, their method of feeding is not identical, nor is the level at which they feed or the method of breathing the same. A very few wrigglers are carnivorous, feeding upon others of their kind. All the *Anopheles* are top feeders, skimming spores and other material that falls upon the surface, and these forms may exist in very shallow water, along the grassy edges of streams or pools, or in partially over-grown swamps among or even over partially submerged leaves, the body resting parallel to or upon the surface of the water. These species depend entirely upon atmospheric air for their supply of oxygen, and that is drawn in through a short tube at the anal end of the body. The species of *Culex* as a rule feed upon organisms living beneath the surface or even on the bottom, coming to the surface only to breathe by means of a longer tube than that of *Anopheles*. They never lie on the surface and require deeper water than those of the preceding

type. A few species have, besides the anal tube, tracheal gills developed at the hind part of the body, and these need not necessarily come to the surface to breathe: they are able to and do obtain a large portion of their supply of oxygen directly from the water. A very few species, of which *Culex perturbans* is our only local representative, are bottom feeders and get their supply of air out of large-celled plants. Here the anal tube is modified into an auger-like structure which is forced into a plant stem or root, and there the insect rests, getting its oxygen supply out of the plant

Manifestly, while we can use oil to kill the wrigglers of those types that get their air supply above the surface, we cannot so reach those that are not surface breathers. Fortunately all our pestiferous forms except *perturbans* are dependent upon atmospheric air and can be reached with oil; but where *perturbans* is the species in fault none of the ordinary methods of procedure are available.

There is a still greater divergence in the egg-laying habits of the insects. The house mosquito and a very few others lay them in a raft or boat on the surface of the water, and that is the form in which they are commonly seen, because these include the common, annoying forms. The species of *Anopheles* also lay their eggs on the surface, but singly or in little groups, never bound together in a boat or raft. Eggs so laid usually hatch within a day or two; but *C. perturbans* is an exception in this respect as well as in larval habit.

By far the larger proportion of species do not lay their eggs on or in water at all or, if they do, the eggs do not remain on the surface. All of the salt marsh forms except *C. salinarius* and most of the woodland species lay their eggs in mud or in moist depressions where water has been and is likely to be again. Such eggs often retain their vitality for long periods, measured not by days, weeks or months, but by years, and they may be dried out completely for a long time without losing the power of development. When circumstances favor, the larvæ hatch promptly, so that after a year or two of dormancy in the egg stage develop into the adult form within a week or ten days.

So there is great divergence in the length of adult life, in the habits of the adult and in the number of broods. Most of the woods mosquitoes have only a single brood annually, developing in early spring from eggs that have lain dormant during the winter, and

the adults from that brood may and generally do live until after midsummer, biting as often as they get a chance to do so. Some of these woodland forms never leave the shelter of the trees even in pursuit of food; but some of them will fly some distance out at night. In such cases settlements in or along the edge of woodland may be troubled on piazzas or in open rooms; but the insects rarely make any effort to get indoors and do not remain. The species that breed on the salt marshes—except *salinarius*—also winter in the egg-stage and develop early in spring; but of these there may be from four to eight broods during the summer, depending upon weather conditions. These species develop only after a storm that fills the marsh depressions or after an unusually high tide or a combination of the two. Unlike most other mosquitoes these marsh forms have a peculiar migratory instinct developed. Within a day or two after a heavy brood comes to maturity, if there comes a warm quiet night with only a moderate wind, thousands—yea millions of the insects will rise as if by concerted action high in air and will partially fly, partially drift for many miles with the wind, settling down over the country many miles from their point of origin. I have watched *cantator*, one of the salt marsh forms come into a window in Philadelphia before midnight, after a flight that could not have been much less than forty miles, and I have had reports of a rising up of *sollicitans* from the marsh along the Barnegat shore and of the presence of the swarm in the pines early next morning, where none were the day before. The arrival of *teniorhynchus* has been actually noted at the brow of the Palisades in New Jersey on an east wind when the nearest known breeding place for the species was at the mouth of the Bronx River in New York State. None of the inland species so far as I know them have this migratory habit so well developed, though *perturbans* possesses it to some extent. None of these forms are really house mosquitoes in the sense that they will make special efforts to get indoors. They will fly through an open door or window or follow in a victim; but they are readily kept out by even an imperfect screen and they are usually at least as anxious to get out as they were to get in. They never remain to hide or to hibernate.

The species of *Anopheles* hibernate in the adult stage and ~~are~~ are house mosquitoes in the sense that they try to get indoors and will remain there by preference until the desire to oviposit develops.

They do not breed by preference in dirty, and not at all in filthy, water. They frequent grassy edges of pools, ponds or sluggish streams, and are sometimes found in water barrels, pails, tubs or the like. They are not so closely associated with humanity as *C. pipiens*, but find its company desirable as food. These species do not begin breeding very early and are rarely seen in the larval stage much before midsummer; but they will continue to breed until actual frost, and there may be four or even five broods during the season. Beginning with the latter part of September some of the impregnated females seek shelter in barns, cellars, outhouses, in sheltered overhangs among roots of trees and begin their winter dormancy. This dormant population increases until late October; but the specimens maturing later do not seem to mate, and die off. Over 5,000 specimens of *Anopheles punctipennis* have been taken during the winter in a single barn, and *Anopheles* was not a troublesome form in that vicinity either. It was simply the best available place for the purpose in the neighborhood. The species of this genus do not ordinarily fly for great distances. They seem to require blood food to mature their eggs and will travel far enough to find that. Half a mile is well within their compass and I feel sure that is not the limit; on the other hand they will under ordinary conditions fly no further than necessary and in malarial outbreaks a distance of 1,000 feet from the breeding area for the species is rather unusual, while 500 feet is common.

The house mosquito, *C. pipiens*, derives this name from its efforts to enter into our dwellings and its determination to stay there as long as possible. From its breeding habits it is also termed the rain-barrel or dirty-water mosquito, and it might with equal justice be called the sewer or sewage mosquito. It also hibernates in the adult stage, and preferably in cellars, where it rests on the side walls or ceilings, in dark and slightly damp places. In very cold weather the specimens are dormant and not easily started into activity; as it becomes warmer they fly ever more readily, and in May are ready to leave and start breeding. They do not bite during the winter for that would start development of the ovaries and, unless the insect found a chance to oviposit, it would result in its death before spring. Breeding is continuous during the summer and the number of broods depends only on the supply of dirty water. From egg to adult requires only eight days, and



a week later the new adults are ready to reproduce their kind. During midsummer when wrigglers become numerous and pools small, an undersized brood is apt to develop and these specimens find little difficulty in getting through the ordinary wire-netting screens.

This species will get into houses if it possibly can, through openings of all kinds and has even been accused of getting down the chimney and out through fire-places. It requires the closest kind of care and most persistent watching to exclude them and even then a few specimens manage to get in during the summer and the cellar becomes filled during the winter. After a summer like that of 1910 a cellar population may number hundreds or thousands, depending upon the ease of entry.

From what has been said it is apparent that the primary factor upon which success depends is a knowledge of the species in fault. Knowing this we are in position to deal with the species with a fair prospect of success.

In suburban communities where any amount of woodland remains and the houses are more or less surrounded by trees, woodland species are apt to be troublesome early in the season, and if that proves to be the case, the breeding pools can be very easily located and abolished. Where they can be drained that is the safest and most permanent disposition to be made of them. Where that is not possible the depressions may be filled with leaves, branches or other broken woodland rubbish sufficient to absorb the water or completely cover it. That will serve to prevent access by the female mosquitoes and will prevent them from laying eggs. Where neither draining nor filling is feasible or possible, the breeding area may be covered with oil as soon as larvæ are found which will usually be in April. As there is only one annual brood of these pests, one treatment only, sufficient to destroy all the larvæ then present, is necessary to secure exemption for the summer.

As water is necessary to enable the insects to develop, so it is only necessary for us to locate the water in which these wrigglers breed, to enable us to deal with them. And that leads to the statement that by no means all water areas are mosquito breeders. As a rule the larger and deeper the pool, the less the danger. Wrigglers will not develop in areas swept by the winds or in "ripple" areas. Nor can they maintain themselves in pools or



ponds containing fish, provided the edges or banks are sufficiently clean to permit the fish to reach all portions of it. In grassy or overgrown edges or areas larvæ will breed. Ponds or pools covered with duck-weed are safe and so are pools filled with the stringy *Spirogyra*. Deep cold swamps breed no mosquito larvæ nor do dense overgrown cat-tail areas. Many campaigns have failed because all the efforts were made against and work done on areas where no breeding occurred while the places where the species really developed were unnoticed. Flowing streams are not often sources of danger, especially where they contain fish; but they may become so in a droughty period or when the water is low and the flow is interrupted.

Where *Anopheles* is in fault the larger water bodies must be examined and if an overgrown pond or a sluggish stream is found in fault, it will mean cleaning up to enable fish to operate, or cleaning out, to improve the flow of the stream.

Where *perturbans* is in fault each case must be dealt with according to local conditions and no general rule can be laid down.

If the salt-marsh species is at fault an inland community may find itself absolutely helpless. There are hundreds of square miles of mosquito ridden territory in New Jersey where not a single mosquito breeds and where the residents can only suffer or join in aid of the state fight.

Where the ordinary house-mosquito is in fault it means close, sanitary, house-to-house inspection and in this campaign every householder should join. Water barrels and cisterns should have every opening closely screened with close-meshed wire or a double netting. Cess-pools should be sealed or, if ventilated, the ventilating pipe should have a double wire netting. Every depression capable of holding water should be filled, or periodically oiled, and every sewer catch-basin or settling basin should be oiled periodically during the summer. Once every ten days is sufficient in periods of drought, and within a week after every rain a coating of oil should be put on. To enumerate all the places that should be looked after is impossible, and should be unnecessary when we have learned that every pool, puddle, or receptacle containing water may be dangerous.

In a very wet season there is danger because then many places where water ordinarily evaporates promptly, may be kept filled

long enough to develop the insects. But in such a season the sewers and sewer catch-basins rarely become sources of serious trouble. In a very dry season the sewer basins become the source of most intensive breeding; and small streams carrying off surface water become reduced to breeding puddles. Of the two the droughty season breeds more city and town mosquitoes than the rainy one.

The campaign should begin in winter, against the hibernating species in houses. I have tried many sorts of fumigants and more have been tried by others; but the only reliable destructive material that I have found is Mim's Culicide. That is a mixture of carbolic acid crystals and gum camphor, using equal parts, by weight. Liquefy the carbolic acid crystals by a gentle heat, break up the gum camphor into small pieces and pour the liquid acid slowly over the camphor. The acid will dissolve the camphor completely and the resulting liquid is permanent and only slightly volatile at ordinary temperatures. It volatilizes rapidly, however, in a shallow dish over the flame of an alcohol or other lamp and the vapor is death to flies and mosquitoes. Three ounces will suffice for 1,000 cubic feet in a tightly closed room, and it will require about half an hour to evaporate that amount. The vapor is not poisonous to man, is not destructive to metals or fabrics and is disinfectant in quality. In a large cellar there should be fumigants at several points to secure equal distribution of the vapor and equal effect throughout the cellar. The material is not explosive, but is inflammable and should be used with that fact in mind.

In New Jersey the sanitary position of the mosquito question is determined in the general health law of the state which defines among the nuisances "waters in which mosquito larvæ breed," and over these local boards of health have the same jurisdiction as over any other nuisances, with absolute power to abate.

The dual nature of the problem is strikingly illustrated in this state with its long coast line bordered by salt marshes of relatively enormous extent. More than half the area of the state was periodically overwhelmed by flights from these marshes and perhaps ninety per cent of all the mosquitoes in South Jersey were bred on the salt marshes. It was manifestly useless to preach local campaigns here where, even across the two ranges of the Wasatch Mountains, no local campaign could promise exemption from trouble. Nor could the thinly settled townships in which these salt marshes

occurred, be reasonably asked to abate the nuisances for the benefit of the more densely settled localities inland. There was only one authority fit to cope with the problem and that was the state itself. The value of the New Jersey seashore for summer resorts offered an additional inducement for state interference, and \$350,000 was appropriated for draining the salt marshes, of which \$83,500 has been made actually available. It seems like a terrific task to undertake the extermination of mosquitoes from an area of over four hundred square miles of desolation; nevertheless the work is in progress and up to the present time the cost has been within the estimates upon which the original appropriation was based, notwithstanding the fact that the cost of labor has been materially increased. Over four million lineal feet of ditches have been dug and over 25,000 acres of salt marsh have been made approximately mosquito proof. The character of the problem has been changed in the more northern localities, and it has become a local one in which the local municipalities are now concerning themselves and may count on success.

On the salt marshes the areas are first carefully surveyed to determine where breeding places exist. The aid of the local board of health is then invoked and notice is given to marsh owners making them acquainted with the facts and the law. They are given an opportunity to abate in their own way if they will, but if they do not—as generally happens—the entire area is drained in one block, under a general plan, and the work is paid for by the state. The matter is not really so serious as it looks at first blush, because the marshes are peaty in character and the water runs out easily. The ditches are thirty inches deep, usually ten inches in width, and placed about 200 feet apart in ordinarily bad areas. Some very rotten marsh is more thoroughly ditched and sound level marsh is not interfered with at all. These ditches through the turf stand indefinitely and, owing to their narrowness and depth, never grow up from the bottom. If not interfered with they will drain the marsh of surface water within forty-eight hours after being flooded by storm or tide, and will thus prevent the maturing of such larvæ as may hatch. There is no pretense of reclaiming the marsh for agricultural purposes, and all the ditches connect with tidewater so that the character of the land is not changed. But the character of the grass is affected by the drainage and

it becomes different in type and better, giving also much larger crops.

The work has been in progress for only four years and has just begun to show effects, but as the area treated is enlarged and the benefits become evident over a greater region it is hoped that more co-operation will be secured and more rapid progress made. The additional comfort secured where mosquitoes are absent has, in some localities, already brought crowded houses and induced building so that as a mere investment the work will eventually pay heavily. In the additional benefits secured by the person seeking rest and health at the seashore, the return cannot be measured by money values.

In the local campaign, the state organization acts in an advisory capacity only. It will make surveys, inspections and reports for any municipality desiring the same, and it will advise as to what should be done. Experiments are made with oils and other materials suggested or recommended for the control of the insects in any stage, and annual reports are made and published, showing the progress of the work and the information obtained.

Recently an organization has been formed by representatives of boards of health from a group of counties centering about Newark, Jersey City and Elizabeth, and for the benefit of these an inspector will be maintained merely to give notice to the local authorities of developments requiring action to control or destroy breeding places. Efforts will be made to secure permanent drainage or filling of the larger swampy areas, the diversion of small brooks carrying surface waters into trunk sewers, and the elimination of all the small breeding areas by orders of the local boards of health.

No one who has not had actual experience can realize in how many different kinds of places mosquito wrigglers can be found, especially in an active manufacturing city. Wherever water is stored in tanks for any purpose they have been found: in a pickle factory a lot of seventy-five hogsheads stored in a yard were partly filled with water to prevent shrinkage, and thousands of wrigglers were in each, supplying the neighborhood for squares round about with mosquitoes. In fire-buckets, even in halls of hotels they are not uncommon, and in the thousand and one different sorts of containers of the hundreds of factories, there is almost unlimited opportunity for mosquito propagation. Even in dwellings a neglected

aquarium has been found infested, the flush tank of a rarely used closet and the exposed trap of a shower bath serving as further examples of wriggler adaptation. \*

The sanitary officer in charge of a municipal mosquito campaign has no light task and his first effort, after educating himself, must be to educate his constituency to co-operate with him.



## CLEAN MILK AND PUBLIC HEALTH

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Behind its veil of opaque whiteness, every quart of milk hides a potential peril to the public health. To the unaided senses, unwholesome or dangerous milk may present exactly the same appearance as the purest and safest supply obtainable. Until the horizon of intelligence and imagination has been extended by science, therefore, it is exceedingly difficult to appreciate the serious need for being constantly on guard against a menace so intangible and so insidious.

Even before bacteriological and chemical research had disclosed the hidden causes of disease, milk was known to constitute a very important danger to health, and crude methods of improving the "keeping" qualities of milk by heating and refrigerating had been developed. The rapid growth of cities, however, and the consequent ever-increasing separation of the dairy farms where milk is produced from a vast number of the homes where it is consumed, has introduced a new and very serious difficulty into the problem of providing city consumers with a safe milk supply. Whereas, formerly, it was possible to distribute milk to consumers within a few hours after it was drawn, it is now frequently necessary to transport a supply from very great distances and thus separate by twenty-four, thirty-six, or even forty-eight hours the time when milk is drawn, from the time when it is delivered to consumers. When we reflect that milk is probably the most generally used article of food; that it furnishes an almost ideal culture medium for very many forms of disease germs; that it may very easily become infected at any one of the many stages of its progress from cow to consumer; and that, at favorable temperatures, the number of disease germs it contains will increase with almost incredible rapidity, the significance of the time element, as well as of care in handling milk, will at once be apparent.

With the growth of scientific knowledge regarding specific

dangers from infected milk, and with the increasing difficulty of obtaining a safe supply, there has come a more intelligent appreciation, on the part of laymen and of health officials, of the need for a comprehensive and effective plan for controlling a community's milk supply, especially in the case of large cities. There is probably no factor in a public health program that is being more actively and more persistently studied or that gives promise of more immediate and more positive results. Clean water, clean air, clean food, clean streets, clean houses, clean clothing, and clean bodies are the indispensable elements in modern preventive hygiene; and among these, if we measure importance by the potential effect upon disease and death rate, clean milk must be assigned high, if not first, rank.

Careful estimates place the average annual consumption of milk in the cities of the United States at twenty-three gallons per capita, some authorities estimating the quantity as high as one-eighth of the entire food consumption of the urban and suburban population. On this basis alone, the importance to the public health of protecting the milk supply from contamination and deterioration needs no argument. In view of the further fact that milk forms the chief and, in many cases, the sole element in the diet of the sick, the aged, and the infant members of society, the necessity for precautionary measures receives further emphasis. The technical difficulty of testing milk as to adulteration and infection, the great distances and varied sources from which city supplies are obtained, and the large cost involved, make it wholly impracticable for individual consumers to discover by direct investigation the quality of milk served by dealers. It is clear, therefore, that for reasons of economy and efficiency of service, the inspection and regulation of a community's milk supply is properly a community function, to be performed by a governmental agency having adequate legal powers, and the organization and administrative methods necessary to make its powers effective.

Stated in the simplest terms, the control of a milk supply has two main aspects, the first having to do with chemical constituents which is related chiefly to the food or nutritive value of milk; the second with bacteriological content, which is related chiefly to the pathological or hygienic effects.

On the side of chemical content, a few simple and well-defined standards concerning adulteration and the use of preservatives have been clearly established, though not even these have been everywhere accepted as a basis for practical control. It is known that the use of preservatives is both unnecessary and harmful. It is unnecessary, because milk produced under proper conditions and handled with care will "keep" long enough to permit of transportation and distribution within necessary and reasonable limits of time. It is harmful, because the addition of salicylic acid, formaldehyde, benzoic acid and other chemicals used as preservatives either impair the digestibility of milk or injure the digestive organs of the consumer, especially in the case of young infants, whose membranes are extremely sensitive to such irritants. Although the use of such preservatives is prohibited by the national pure food law of 1906, and by the laws of many States, there is still a wide sale for these chemicals under such trade names as "Iceline" and "Freezine." It is not uncommon, especially in the summer, for a dairyman to add one of these preservatives; the wholesale dealer, in ignorance of this fact, adding a second treatment; and the retail dealer, again in ignorance of what has been done, adding a third preservative to the same milk. Such practice is, of course, little short of criminal. It can be detected only by chemical tests and can be prevented only by constant inspection and vigorous prosecution of offenders.

Adulteration is still practiced to a very considerable extent, the most common methods being the addition of water or skimmed milk and the removal of cream. The addition of chalk and other materials for thickening and coloring milk is probably practiced to a very limited extent. Adulteration of any kind, without the knowledge of the consumer, is unwarranted and fraudulent. The addition of water not only alters the nutritive value of the milk, but is often a source of pollution; the introduction, even in minute quantities, of water infected with typhoid or other water-borne germs being sufficient to start a widespread epidemic. The removal of cream materially affects the food value of milk and in this way may result in serious consequences to infants and others dependent upon a milk diet.

Gross adulteration is readily tested either by chemical or by physical (lactometer) tests. Inasmuch as milk varies considerably in the relative amount of water and of solid contents which it normally contains, however, it is impossible, within certain limits, to determine by inspection whether or not water has been added. The usual method of controlling water adulteration is to fix a minimum standard of solid contents and to exclude or destroy milk not conforming to this standard. It is readily seen, however, that milk containing milk solids in excess of the standard may be manipulated by adulteration or by removal of cream so long as the legal standard is maintained.

It is a common error to assume that milk found to meet a legal standard as to solid contents may thereby be known as milk of high quality. As a matter of fact, when milk just reaches the usual legal standards, it is *prima facie* inferior in quality, being of the lowest grade permitted. There has been a tendency, recently, to lower legal standards so that milk from certain breeds of cow, notably the Holstein, which is normally deficient in milk solids, might come within the prescribed limits. Such legislation might be characterized as itself a species of adulteration, placing, as it does, a premium upon low-grade milk and making it possible for an unscrupulous dealer to impair the food value of milk normally good, by the addition of water or the removal of cream, without making himself liable under the law.

It is true that the minimum limit must not be placed so high as to exclude the milk from too many herds. Aside from the danger of infection, however, there seems to be little difference between adding water after milking, by means of a dipper, or before milking, through the natural processes of secretion. The rational remedy for this difficulty appears to be the grading of milk on the basis of its food value and the fixing of prices for the several grades, so that both dealers and consumers may reap the advantage of maintaining high standards. Such a plan requires that consumers be so educated as to appreciate the difference between high-grade and low-grade milk, and to demand satisfactory evidence as to the quality of milk received.

The second main aspect of the problem of controlling a milk supply has to do with the bacteriological content of milk, which

is the side of the problem most intimately related to the public health.

Next to polluted water, there is probably no more prolific source of infectious disease than contaminated milk. The danger from infected water has been widely recognized and methods of protection by filtration and by other means have been so thoroughly studied and so well developed that many communities have practically eliminated water-borne epidemics. In such communities, as well as in those where typhoid is still distributed through the water pipes, polluted milk continues, without effective check, to play its part in causing periodic epidemics of typhoid, scarlet fever, diphtheria, diarrhea and other infectious diseases.

In a recent bulletin (No. 56), the Public Health and Marine-Hospital Service of the United States gives a tabular summary of 500 epidemics in which there is conclusive evidence that milk was the carrier of typhoid, scarlet fever, diphtheria and septic sore throat. In each case the circumstances of the outbreak are described, together with the evidence that milk was the source of the disease, the manner in which the milk was infected, the number of persons affected, the number of deaths, and the number of persons supplied with milk from the dairy to which the disease was traced.

The facts presented in this summary show that a typical milk epidemic is explosive in its outbreak, the infection being carried to all users of a given supply at practically the same time, thus causing a relatively large number of them to develop the disease simultaneously. The disease in such cases follows a milk route so closely that a map of the route may frequently be outlined by merely charting the cases of the disease as they are reported. It is found that the homes of the well-to-do are often attacked in greater proportion than others, owing to the fact that families with larger incomes commonly drink more milk than those with smaller resources; the latter using milk mainly in tea or coffee and in food preparations that are cooked. Similarly, it is thought that women and children, being larger consumers of milk than men, are more frequently affected by milk-borne epidemics. The 500 milk epidemics described in these tables are only a few of those concerning which definite records



are available. The immense number for which such records are not available can only be surmised.

The precise relation of milk to the spread of tuberculosis has been a matter of uncertainty. The announcement made by Koch, about ten years ago, that bovine tuberculosis is very slightly, if at all, transmissible to human beings, seemed at the time to dispose of a very serious problem. Subsequent investigation by a large number of observers, however, has removed all doubt as to the fact of transmission of the disease from cows to human beings. One of the most active of these observers, von Behring, goes so far as to state that the use of cow's milk as food for infants is the principal cause of human tuberculosis. More conservative authorities estimate the percentage of the disease in man due to bovine origin as low as three per cent. Taken with the fact that not less than 160,000 deaths from tuberculosis occur annually in the United States, even this low estimate shows that cow's milk infected with tuberculosis presents a very grave menace to the public health.

There is no doubt that, among children under five years of age, bovine tuberculosis is relatively a much larger cause of the disease than among adults. Recent observations in two institutions for the care of children in New York strongly support the conclusion that about one-half of those children who develop tuberculosis and who are fed upon raw cow's milk contract the disease from infected milk. Since about one in fourteen deaths from tuberculosis in the United States, for the year 1905, were among children under five years old, it is probable that 6000 deaths among these children were chargeable directly to infected milk. The number contracting the disease within this age period and dying later cannot, of course, be given, but must be very large.

Reliable facts concerning the prevalence of tuberculosis among herds are difficult to obtain. Apparently the number varies greatly with climate, location, and the care given to the cows. In certain districts, autopsies show as high as 60 per cent. of the cattle to be tuberculous; in others the number is so low as to be almost negligible. Taking the country at large, it seems likely that not less than one in three of the dairy herds and not less than one in five of all dairy cows are tuberculous. Considering the fact that milk from a single tuberculous cow

may be mixed with and thus contaminate the milk from a large number of cows not affected, and that tubercle bacilli contained in the feces of infected cattle may contaminate milk from non-tuberculous cows, the spread of tuberculosis through a milk supply is seen to be a matter calling for vigorous and constant action.

Important as it undoubtedly is to safeguard the milk supply of a community as a means of controlling the ravages of typhoid, scarlet fever, diphtheria and tuberculosis, it is even more important as a means of reducing the enormous mortality among infants which is chargeable in very large measure to gastro-enteritis (diarrhea), the dominant cause of which is unclean milk and ignorant feeding.

The number of deaths among infants under one year old in the United States, for the year 1909, was approximately 250,000, which is about one-fifth of the total number of deaths of all ages. Of this startling number of infant deaths, it is estimated that almost two-thirds were preventable; at least one-quarter being caused by enteritis alone—a shocking sacrifice to ignorance and carelessness.

The stupendous proportions of this annual waste of infant life will be more clearly appreciated when it is compared with the 160,000 annual deaths from tuberculosis and the 20,000 from typhoid, which are the occasion of such general agitation. The infant deaths from enteritis alone—attributable almost wholly to milk infection—were about three times as numerous as the deaths of all ages from typhoid, which is itself very largely a milk-borne disease.

In an article appearing in the *American Journal of Medical Science* (Vol. CXXXII, pp. 811-835), Harrington gives the following statement regarding the infantile death rate per thousand infants in the States constituting the registration area of this country. The figures are based upon the report of the Bureau of the Census for 1900.

District of Columbia .....	274.5	New York .....	159.8
Rhode Island .....	197.9	Connecticut .....	156.8
Massachusetts .....	177.5	Maine .....	144.1
New Hampshire .....	172.0	Vermont .....	122.1
New Jersey .....	167.4	Michigan .....	121.1

The cities show an even higher infant mortality rate. One hundred and six towns and cities had a rate of 175 or more per thousand, nine of these having a rate exceeding 300 per thousand; the highest rate, that of Charleston, S. C., being 419 per thousand. Eight of the largest cities had infant mortality rates as follows:

Washington, D. C. ....	274.5	Brooklyn, N. Y. ....	197.2
Baltimore, Md. ....	235.1	Boston, Mass. ....	194.1
New Orleans, La. ....	229.2	Borough of Manhattan ....	190.9
Philadelphia, Pa. ....	197.2	New York, N. Y. ....	189.4

In a chapter on "Infant Feeding," in the bulletin before cited, Dr. Schereschewsky quotes records showing that in France, during the five-year period 1892-1897, 385 infant deaths in every 1000 were due to gastro-intestinal diseases; the death rate from this cause in certain cities running as high as 700 per thousand infant deaths. Records are given for 42 German cities, also, showing infantile death rates ranging from 127 to 271 per thousand births, the average for the forty-two cities being 198. The per cent. of these deaths due to diarrhea varied from seventeen to fifty-four per cent, the average being forty-four per cent. These figures are interesting as showing the relative mortality in American cities and as confirming the conclusion that a great proportion of infant deaths are due to the single preventable cause of diarrhea.

The fact that the number of deaths from diarrhea invariably increases enormously during the summer months, when it is most difficult to prevent the multiplication of bacilli in milk, is further evidence of the need for more effective control over milk infection. Schereschewsky states that in the city of Leipzig, whose percentage (54.9) of deaths from diarrhea is the highest among the German cities, the infant mortality in February was 131 per thousand, of which thirty-seven were from diarrheal diseases. In August the infant death rate had increased to 570, of which 430 (75.6 per cent.) were from enteritis. It is a general observation that the great wave of infant mortality during the summer months is accounted for almost wholly by the increase in intestinal diseases.

The part played by infected milk in this summer mortality

is strikingly shown by the contrast between the death rate among breast-fed and that among artificially fed babies. Planchon (quoted by Schereschewsky) shows that while the diarrheal death rate of breast-fed infants in Paris varies from a minimum of two per thousand in winter to a maximum of twenty per thousand during the summer, the rate for artificially fed infants varies from twelve per thousand in winter to 158 in summer. Harrington's figures, for a five-year period in Berlin, show similarly that, in cases where the mode of feeding was known, about ninety per cent. of infant deaths were among artificially fed babies, and ten per cent among the breast-fed.

Such figures as are available for American cities fully confirm the great disadvantage of artificial feeding. In a recent paper presented at a conference called by the New York Milk Committee, for example, Dr. William H. Park gave the following observations as to the effect of different types of feeding upon infant mortality and morbidity:

Kind of Feeding	Observed	Number of Infants	
		Died	Sick
Cheap store milk—heated .....	79	15	20
Condensed milk .....	70	14	14
Good bottled milk .....	98	9	29
Good milk—modified and bottled .....	145	4	24
Certified milk .....	12	0	0
Breast milk .....	31	0	7

Figures might easily be multiplied to emphasize the advantage of breast feeding. The fact remains, however, that the increasing number of women entering industrial pursuits, and other influences incident to modern urban life, are causing a distinct decline in the practice of breast feeding. Deplorable as this tendency may be conceded to be, it is not likely to be checked so long as economic forces continue to operate as at present. The problem of preventing the great annual needless mortality among infants is, therefore, a problem of providing cow's milk free from infection and from injurious preservatives, and of educating mothers and caretakers to prepare and administer such milk in a manner suited to the nutritive requirements of infants.

The chief sources of contamination to be considered in formulating and carrying into effect a program for safeguarding a community's milk supply are: First, human beings having infectious

diseases and those carrying infection on their persons; second, diseased cattle; third, polluted water; and fourth, bacteria-laden dust and dirt.

It is obvious that no person affected with typhoid, tuberculosis, scarlet fever or other infectious diseases, or who has contact with persons so affected, can handle milk or vessels to be used as milk containers without subjecting the milk to serious danger of contamination. It is not so commonly understood, however, that convalescents and persons who have apparently recovered entirely from certain diseases may continue to discharge bacilli for weeks, for years, and even for the whole of their lives. Notably in the case of typhoid, persons who have been in contact with the sick or with bacillus carriers may become centers of typhoid infection without themselves developing the disease. It has been estimated that there are about as many typhoid carriers at any given time as there are actual cases of typhoid. When to these are added the individuals in the early stages of the disease, who may continue to handle milk so long as they are physically able to do so, and others who may handle milk throughout the entire course of a mild form of the disease, it will be seen that there is reason for the utmost vigilance in this direction.

Of the diseases of cattle which render milk unfit for human consumption, tuberculosis is undoubtedly the most important, as well as the most prevalent. Where the cow's udder is tuberculous, the danger of infection through the milk is generally recognized by students of the subject. It appears to have been clearly proven, also, that the tubercle bacillus is sometimes found in the milk of cows whose udders are not specifically involved, especially where the disease has reached an advanced stage, but also in cases where the disease can be diagnosed only by means of the tuberculin test. As the milk from an entire herd is commonly mixed for transportation, it is clear that the presence of a few tuberculous cows in a herd may infect the entire product and render it unsafe for consumption.

Cows affected with gastro-enteritis, garget, cowpox, ulcers, and other septic or febrile conditions frequently produce milk infected with pus-producing bacilli, certain of which are known to cause enteritis. Moreover, even when no active pathogenic



organisms are found in milk, poisonous properties resulting from disease and from unwholesome food and water may be present in sufficient quantity to constitute real danger to persons taking such milk.

Polluted water, even where it is not used as an adulterant, is a frequent source of milk contamination. Wells and streams are often so located that the drainage from barn yard or privy vault readily finds its way into them. Decaying animal matter and excreta from patients having typhoid and other infectious diseases are often disposed of in such a way as to subject the water to contamination. Milk pails, cans, bottles and dairy equipment of other kinds, when washed with water so polluted, unless afterwards sterilized with boiling water or steam, may become the means of infecting the entire product of a dairy farm.

At every step in the handling of milk, from the cow to the consumer, there is constant danger of infection from dust and dirt. Hair and dirt from the cow's flanks and udder; manure and dust from the floor, walls and ceiling of the stable or milk-house; minute particles from the hands and clothing of the milker or handler of milk; disease-laden dirt and filth on every hand, in dairy, milk shop, milk wagon, kitchen and refrigerator—all these contain the virulent seeds that need only be scattered by air or water or flies or the hand of man to produce a certain harvest of misery, disease and death. Modern aseptic surgery has taught the world the vital meaning of absolute cleanliness. The lesson is directly applicable to the problem of obtaining an adequate supply of clean milk. When we come to apply scientific method to the study and control of milk infection with the same intelligence and thoroughness that have been shown in surgical practice, we shall eliminate quite as much needless suffering and waste of human life as was done away with forty years ago, when the old skull-and-cross-bones surgery came to a sudden end.

Meantime, our septic method of producing and handling milk may be expected to continue until producers, distributors and consumers are ready to face the facts and, at whatever cost, to support the practical measures necessary to produce clean milk at the dairy farm and to keep it clean all the way to the consumer. A comprehensive program of this kind will involve

the isolation and often the sacrifice of diseased cattle. It will mean effective inspection of cattle, milk handlers, barn yard, water supply, stable, cattle, feed, dairy equipment, methods of milking and handling milk, transportation equipment and methods, sanitary conditions of city milk plants, of bottling works, of milk shops, and of milk wagons, and methods of caring for and handling milk in the homes. It will require the acceptance and enforcement of sanitary standards at every point where milk and dairy products are produced or handled; of a temperature standard so low that the few bacteria that will inevitably reach all milk shall have no opportunity to multiply; of a standard of bacterial content sufficiently low to exclude milk dangerous to health; and of a chemical standard so rigid as to prevent the sale of milk that is in any way adulterated or that is unduly low in nutritive value. The plan will doubtless require also that milk, ice-cream, butter and other dairy products be scientifically graded, according to quality; that they be so labeled as to indicate accurately their food value and degree of purity; and that prices be graded to agree with quality.

The program, furthermore, will call for an inspection service having adequate legal powers, effective supervision, and a staff of appropriate size and technical qualifications. The function of the inspection service will be not merely to ascertain facts for the purpose of locating defects and conducting prosecutions, but for the more important constructive purpose of educating producers, dealers and consumers as to the best methods for overcoming difficulties, for avoiding dangers, and for obtaining, with minimum cost and maximum satisfaction, a supply of milk that shall be safe and wholesome. The final and most effective factor in the program will be an informed, alert and exacting public, which will demand facts and discount unsupported opinions; which will insist that, day by day and hour by hour, such a record of work performed and results accomplished shall be kept by every producer, distributor and inspector of milk as will fix responsibility for results; and which will mete out, with even-handed justice, the appropriate reward of fidelity or dishonesty, efficiency or incompetence.

Hardly more than a beginning has been made in this country toward the development of such a program. A few States have

made some provision for dairy inspection, but this is generally limited to the examination of herds for diseased cattle, with occasional attempts at sanitary inspection of dairy farms. The State service is so inadequate that most large cities find it necessary to maintain their own inspection service. The reasonable division of functions would appear to be for the States to assume responsibility for conditions on the dairy farms, and the cities to control conditions incident to the distribution of milk within their own borders. This would avoid the duplication of inspection by cities drawing their supplies from the same territory and would make it impossible for a dairyman, when his milk is excluded from one city, to proceed at once to market his product in another city whose standards are less stringent or less rigorously enforced. Local and state regulation is to some extent supplemented by federal inspection of milk and other dairy products entering into interstate commerce. An extension and strengthening of the federal service would do much to improve the milk of a number of large cities which draw upon neighboring States for their supply.

In view of the numerous difficulties involved and the delays likely to attend a completely satisfactory solution of the milk problem, many persons are concerning themselves chiefly with expedients for solving at once certain of the difficulties and for reducing so far as possible the ill effects of milk produced under existing conditions. Temperature standards of 60 degrees Fahrenheit, or lower, have been established in some cities, with a view to preventing the rapid growth of bacteria and thus reducing the danger of serious infection. With similar purpose, standards have been adopted which exclude milk showing a bacterial count exceeding 100,000, 500,000 or 1,000,000 per cubic centimeter. Standards of 11.5, 12 or 13 per cent. of milk solids and 3 to 3.5 per cent. of butter fat have somewhat generally been established as a means of preventing adulteration. Infant milk stations, under both public and private management, have been established for the purpose of supplying clean milk either in its natural state or sterilized and specially modified to meet the requirements of infants of various ages. A model municipal dairy farm has been operated by at least one city for the purpose of setting a high standard for private dairymen. Complete

municipal ownership and operation of the dairy industry have been advocated, but not yet realized; while the commissioner of health of Chicago advocates the novel plan of bringing into the cities a sufficient number of cows to supply all artificially fed infants with milk less than twelve hours old at the time it is consumed, and of making it legally obligatory to use only such milk for the feeding of babies.

Most important of the proposed expedients is pasteurization, which, in its most approved form, consists in the heating of milk to a temperature of 140 degrees Fahrenheit, maintaining this temperature for twenty minutes, and then reducing the temperature rapidly to 50 degrees Fahrenheit. This process, it has been determined, will kill most pathogenic bacteria found in milk, including the bacilli causing typhoid, diphtheria and enteritis. The conclusion seems warranted also that careful pasteurization does not greatly, if at all, impair the general nutritive value of milk. The effect of pasteurization upon the various soluble ferments contained in milk is still doubtful, though it has been found that a temperature only slightly above 140 degrees Fahrenheit will weaken or destroy the activity of some of them. The functions of the ferments themselves are not fully understood, though they are probably related in a subtle way to the digestive requirements of the new-born. If, as seems likely, the specific character of the ferments accounts in great measure for the advantage of maternal over artificial feeding, the importance of more exact knowledge concerning the way in which they are affected by various temperatures and periods of heating is evident.

Even the advocates of pasteurization generally regard the process only as a valuable protective measure that may lessen the injurious effects of stale, warm, dirty and infected milk, but should not be permitted to interfere with efforts to promote care and cleanliness in every possible way in the production and handling of milk. Pasteurization certainly does not in any way improve the food value of milk and, by impairing the activity of certain ferments, may seriously affect its adaptation to very young infants. It destroys the acid-forming bacteria of milk and interferes with one of the surest evidences by which stale milk may be recognized, allowing certain putrefactive processes of dangerous character to continue without the restraining in-

fluences exerted by the lactic acid organisms in raw milk, and without the knowledge of the consumer. Certain poisonous bacterial products, furthermore, are not destroyed by pasteurization. It will be seen, therefore, that the practice of pasteurization is not to be considered too favorably, nor accepted as a final solution of the problem of safe milk, and that, in the interest of public health, it must be closely supervised by the proper authorities.

The problem of clean milk is to be solved, not by uninformed discussion, nor by the emotional clamor of indignant consumers, nor by the good intentions of producers, dealers, or public officials, nor by unenforced legal provisions. It is to be solved, as all other important problems of social welfare are to be solved, by scientific inquiry as to the facts involved; by the intelligent formulation of a comprehensive program for constructive work; by efficient co-operation on the part of producers, transportation companies, dealers, housewives, health officials, private social agencies; and by an informed, active and exacting citizenship.



## VENTILATION AND PUBLIC HEALTH

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### *Importance of Ventilation*

Air is more essential to life than food, good air is as essential as good food, and plenty of air has the same merit as plenty of food. Unlike food air cannot be had in too great quantities, and an inexhaustible supply of pure air is always available. Being invisible and unfelt we give it no thought, and thus we have come to give little or no heed to its condition. That air quality has a definite relation to comfort and health is never denied, but that means must always be provided to assure proper quality of air in our habitations still fails to find general assent; in other words, ventilation, artificial or natural, as a means of providing fresh air, is still denied proper recognition. This may in part be due to the mistaken idea largely prevailing that artificial ventilation can do for health and comfort all that nature's boundless resources can do, whereas ventilation at its best is but an attempt to approach within doors, as near as may be, nature's outdoor conditions.

Ventilation would make far greater headway if the public did but realize how closely allied ventilation is to individual health. In but few of the relations of life are we free from contact with the public. Whether it be in our homes with our guests, with our children in the schools, traveling in street cars, railway cars or boats, at the opera, concert or church, with the sick in the hospitals, or with the workers in the factories and stores, we are brought so intimately into contact with the public that the health of any part thereof has a definite bearing on the health of the whole.

Ventilation is closely connected with cleanliness. Few of us would care to put on underclothing immediately taken from another person, bathe in water used by another, or put into our mouths articles of food or drink taken from another's mouth, yet we take into our lungs with but little or no hesitation air containing that

which has but just come from other people's mouths and lungs or from close contact with their bodies and soiled clothing.

Experiments of Buchner, Flugge and others have shown that tubercle bacilli and other organisms are sprayed through a room from the mouth, for a distance of many feet and over wide areas, when men talk or cough. In case of influenza, conditions in railway and other cars, churches and living rooms, all may be infected who are not immune.

The public is just beginning to learn of the wonderful results obtained in hospital work with the introduction of outdoor work and wards, but does not yet recognize that the nearer indoor conditions in hospitals are made to approach outdoor conditions by means of the most ample ventilation the better will be the results. When one considers that there are 3,000,000 persons sick in the United States, and that the percentage of cures is increased, and the average length of illness is decreased by ventilation, the public importance of pure air becomes evident.

The benefit of plenty of fresh air is strikingly seen in open-air treatment of tuberculosis. Patients well advanced in the disease, who for months or even years have spent their time bundled up indoors, sitting over stoves or registers, afraid of a breath of cool air, and who under this regime cough continually, sleep poorly and have no appetite, after being required to stay in the open air for twenty-four hours each day, and to sleep in tents or open shacks, in a week's time cease the constant cough, sleep and eat well, put on flesh and look like different creatures. Outdoor treatment of pneumonia, anaemia, nervous and other diseases is equally beneficial.

Probably no place in which people gather is the need of ventilation as a protection to the public greater than in the factory, store and mercantile establishment, nevertheless the vast majority of these are utterly devoid of ventilation of any kind; indeed, as examples of badly ventilated habitations, they are supreme. Persons in charge of factories know they would be blamed were employees to complain that they had taken cold from open windows, while they are not held responsible for sickness due to vitiated air and overheating. The ample protection of health and life in the industries is a matter of humanitarian obligation on the part of the employer and the public, as well as a question of self-interest on the part of the employee. Ventilation cannot properly be regarded

as a high-priced luxury to be enjoyed by the privileged few, but should rather be regarded as a priceless benefit to be enjoyed by all. No investment yields larger returns than that required for ventilation.

### *The Problem of Ventilation*

Ventilation is the process of supplying fresh air and removing so far as possible the vitiated air. The air supply must be clean and free from dust, must be of the proper temperature and humidity, sufficient quantity of air must be secured by proper air movement without injurious drafts; and poisonous gases like carbonic oxide from heating or lighting apparatus must be prevented. Air must be supplied without loss of its freshness.

Air is the medium for carrying oxygen into the lungs, its office being to oxidize the excretions from the blood vessels therein. Oxygen is thus the element of the air that is of the greatest importance to human beings. It is essential in both heating and ventilating work, being the active element in combustion and in the similar processes which go on within the human lungs where it acts upon the carbon and impurities in the blood, forming the chemical compounds which are thrown off during respiration.

Fresh air is taken into the lungs containing approximately 21 per cent oxygen, 78 per cent nitrogen, .04 per cent carbonic acid, and .01 per cent water vapor. The process of respiration changes the composition of the air breathed to approximately 16 per cent oxygen, 75 per cent nitrogen, 4 per cent carbonic acid and 5 per cent water vapor. Oxygen is reduced in amount while the carbonic acid and water vapor are largely increased. Oxygen is utilized for body building, and carbonic acid and water vapor are the products given off during respiration.

Neither water vapor nor the carbonic acid due to respiration is injurious; but as an increase of carbonic acid in the air of an occupied apartment is usually accompanied by a decrease in the amount of oxygen and an increase of water vapor, the percentage of carbonic acid is an index of the quality of the air.

Apparently it is not altogether the chemistry of the air, but its temperature, humidity, motion and possibly other physical properties unknown, which are the attractive features of outdoor air. It is becoming to be generally believed that when air contains a

normal proportion of oxygen, its temperature and humidity are of greater importance than the absence of carbonic acid.

The over-heating of dwellings and public buildings should be avoided. The proper control of the temperature is not alone conducive to health and comfort but means a substantial saving in fuel. Headaches, dizziness, sickness, etc., are often symptoms of heat retention due chiefly to highroom temperature and humidity. It is not uncommon to find houses, offices, etc., in which the temperature sometimes reaches 80°, and yet the occupants can hardly be convinced that the temperature is high, because of the fact that the percentage of moisture in the air is very low. Few of us realize the intimate relation of temperature and humidity, and many people do not appreciate that water vapor is as much a part of the air as oxygen.

The relative humidity of outdoor air at other times than during storms varies from 50 per cent to 80 per cent, and in the most arid desert is rarely as low as 30 per cent, while a relative humidity of 48 per cent, that of Denver, is considered very dry.

Air at zero and 50 per cent relative humidity contains less than a quarter of a grain of moisture per cubic foot. The same air warmed to 70° without the addition of moisture would have a relative humidity of but 3 per cent. Its absorptive capacity is, therefore, immensely increased.

If air on a day on which the outside temperature is zero and the relative humidity 50 per cent be passed through a furnace, and raised to 70°, the relative humidity of the air in a house will be 10 per cent to 20 per cent or dryer than the air of the driest desert known. If a room at 68° is not warm enough for a healthy person we may be sure it is because the relative humidity is too low, except in rare cases when the humidity is so high, *i. e.* 80 per cent or above, that the moisture in the air rapidly absorbs heat from the body, under which conditions one may complain of chilliness even with high temperature. It is unscientific and unsatisfactory to determine upon a temperature for comfort without regard to humidity.

With outdoor weather conditions of zero, and 50 per cent relative humidity, the proper ventilation of a schoolroom containing forty pupils will require the addition to the air of approximately thirty-eight pounds, about five gallons, of water each hour, requiring

for its evaporation, the consumption of approximately five pounds of coal per hour. The fact that there are very few schools with means of humidification is less an argument to be used against such provision than an impeachment of the prevailing methods of school-room ventilation.

The remarkable avidity of dry warm air for moisture causes it to extract moisture from everything with which it comes into contact, and when the tissues and delicate membranes of the respiratory tract are subjected to this drying process a large increase of work is placed upon the mucous glands. This unnatural stimulation may result in an enlargement of the gland tissues, just as constant exercise increases the size of any part of the animal organism. The membrane itself may become thickened and harsh, and the surface prepared for the reception of disease germs, which tend to develop under exposure to the constantly changing percentages of humidity. Not alone are the throat and lungs affected; the tongue, lips and skin become feverish and parched, the eyes redden and smart, the ears are unnaturally dried; catarrh is induced, or is aggravated if already existing. In the case of children predisposed to lung diseases a serious hacking cough is apt to result. Overdry air causes headaches, robs all of vitality, and in every way lowers the vital powers. Generally speaking dry air is an excitant, sometimes causing sleeplessness and irritability, while moist air seems balmy and has a soothing effect which tends to produce restfulness and sleep.

A proper relative humidity lessens the evaporation from the surface of the body and thus the body remains warmer, consequently with air of a relative humidity of 50 per cent to 60 per cent. it is both possible and comfortable to lower the temperature of the house to 65°, schools to 62°, and the temperature of public buildings may be lowered similarly.

The idea that a lessening of the room temperature when raising the relative humidity will result in economy in heating is in error. It takes much more heat (which means fuel) to evaporate the water required to increase the relative humidity than to heat the air 5° or 10°.

The children in the schools with a proper relative humidity are much healthier and consequently are able to think and remember better. Capable officials have determined that the working capacity



of factory operatives is definitely increased in air of proper relative humidity.

It is a sad commentary on our modern civilization that we wilfully allow the health of the school children and the public generally to suffer for the lack of proper moisture while the manufacturer whose commercialism tells him that relative humidity is important to the success or profits of his manufacturing process will provide necessary humidifying apparatus.

Dust is another serious problem in ventilation. Many ventilating systems are worse than useless because the air is taken in at or below the street level or from other dust-contaminated sources, and is passed into the building without filtration, the result being that the last state of the building is worse than the first.

There are two phases to the dust question: the mechanical effect of dust, and its germicidal properties. Careful investigations have demonstrated that dust, especially street dust, is heavily laden with germs, the majority of which are harmless but others are of a most serious nature. Carried into the respiratory tract they lodge in soil splendidly adapted to the propagation of germ life. Dust is a serious irritant, and when drawn into the nasal passages, throat and lungs, may cause irritation and even abrasions. The mortality from consumption is known to be very much greater among persons employed in the so-called dusty trades than among those who work in the open air, or under otherwise more sanitary and favorable conditions affecting health and life. Some trades involve processes in which dust, fumes, vapors, odors, excessive heat and poisons are produced which are really injurious and which are properly removed in but rare cases.

Windows and doors may be depended upon for ventilation of buildings only when it is evident that a sufficient current of air passes through to give thorough ventilation and without causing drafts which strike and chill a portion of the body of those who are insufficiently clad. If sufficient air is not naturally passing through the windows and doors, air movement should be assured by mechanical means.

Drafts and cold are too commonly associated with "colds." Breezes which bathe the whole body not only bring unlimited supplies of the purest air but have a tonic effect. Cold air does not cause "colds." Arctic explorers rarely, if ever, have colds. It

is during the winter months that outdoor treatments are the most successful. The places most to be feared are not out of doors, in hallways and in fresh air currents, but in vitiated atmospheres such as are common to ill-ventilated schools, theatres, churches, railway cars and wherever overcrowding occurs. Drafts of this vitiated air are a menace. Dust, leading to disease infection, is more frequently the cause of colds than fresh air drafts. Unquestionably there exists a misunderstanding of the nature and effect of fresh air drafts and a fear often akin to fright. A weakened vitality, harboring disease germs, may be wonderfully toned up by frequent and generous drafts of fresh air, or to an equal extent may be injured by a lesser movement of vitiated air. A hot, shut-up house is little more than a hot house for the propagation of bacilli and disease germs. Out-of-door life in plenty, ample exercise, and thorough ventilation of indoors may be depended upon to give practical immunity from drafts as commonly known.

While the use of natural ventilation is to be encouraged in every way possible, it may not be depended upon in our climate to the exclusion of artificial ventilation in school buildings, except in special cases where outdoor or similar treatment is desirable, hospitals, churches, factories and other crowded apartments. However, a system of artificial ventilation which is deranged by the opening of windows or doors is hardly worthy the name. On the other hand the reckless opening of windows does not constitute ventilation.

A popular impression seems to exist that warm air is not fresh air. If a distinction be made between warm air and hot or superheated air there is no ground for such an impression. Properly admitted, filtered and warmed, the air supplied by a ventilating system lacks in nothing but quantity. The air must not be so highly heated as to rob it of its freshness, nor must it be laden with traces of ammonia, carbon monoxide or other objectionable gases which may be produced by decomposition of organic dust in contact with surfaces at unnecessarily high temperatures.

In large buildings it is often advisable to distinguish between "heating" and "ventilating," accomplishing the first by means of direct radiators and the second by a suitable indirect system. The designing engineer is, however, confronted with the fact that too often the ventilating system will not be used if the direct radiators

will heat the building,—more shame to the owner whose pocket-book causes him to forget the health and vigor of which the ventilating plant is the conveyor.

Ventilation, like all things good, costs money, indeed it costs more than the heating of the building without ventilation, but in schools, hospitals, offices, and in all such places it is the best possible investment and the one which will bring the greatest returns in increased work done and in improved efficiency generally.

#### *Results Accomplished by Ventilation*

Professor Irving Fisher, of Yale University, in addressing the Association of Life Insurance Presidents, stated that, "It has been conservatively calculated that eight years could be added to the normal period of human life by merely securing reasonably pure air, water and milk." The statement is also made that one insurance company pays \$800,000 annually for death claims on account of tuberculosis alone, which is known to be preventable, principally by the use of plenty of fresh air.

The reports of the Boston City Hospital show that improved general sanitary conditions in that institution changed the death rate from forty-four per cent to thirteen per cent. In the general wards of the same hospital the sanitary improvements effected changed the death rate from twenty-three to six per cent, or nearly in the same ratio as in the surgical wards.

At the S. R. Smith Infirmary, at Staten Island, a comparison was made in two wards of the same nature, containing the same class of patients, in which case it was found that in the ward without ventilation an average of sixteen days was required to effect a cure while in the ventilated wards the average was ten days. This also means a greater work with the same equipment.

Examples are available showing the improvements in results and health due to ventilation, but the time element is so important in such investigations that tests are rare and difficult to make.

Dr. J. N. Hurty, Secretary of the State Board of Health, Indiana, is authority for the statement that, "In properly heated, ventilated and lighted schoolrooms in Richmond, Evansville, and other cities in Indiana, we have secured an efficiency in the pupils of twenty-five per cent over what it was under old conditions. How much of this increased efficiency is due to better ventilation we

cannot say, but the entire increase must be credited to ventilation, proper lighting and even distribution of heat, and regular temperature. We have found through a system of marking and grading pupils that those who work under the best sanitary conditions will accomplish in three years what they ordinarily accomplish in four."

The Germania Insurance Company of New York, in 1910, had eighty clerks in one office. Previous to the proper ventilation thereof, ten per cent were absent on account of illness all the while. Since then, absenteeism has been reduced practically to nothing.

The vice-president of the Manhattan Trust Company of New York states that by proper ventilation he has so increased the efficiency of his clerical force that he has been able to reduce the number of employees four per cent.

The records of the United States Pension Bureau show that when the offices of the department were located in scattered and poorly ventilated buildings, 18,736 days were lost by employees through illness in one year and about the same number for several successive years. When the department became established in new well-ventilated quarters, the loss was reduced to 10,114 days' absence on account of illness, although the working force was much larger.

In the printing establishment of Mr. C. J. O'Brien, in New York, a ventilation system was installed because of the insistence of the State Department of Labor that the law be complied with, the order having been resisted for two years. After the system had been in use a year the proprietor stated that had he known in advance of the results to be obtained no order would have been necessary to have brought about the installation. Whereas formerly the men had left work on busy days in an exhausted condition and sickness was common, now the men left work on all days in an entirely different condition, and sickness had been very much reduced. The errors in typesetting and time required for making corrections were greatly reduced.

Townsend, Grace & Co., of Baltimore, built a straw hat factory without ventilating apparatus. The first two winters after occupation the sick rate was twenty-seven and one-half per cent. A ventilating system was then installed, after which the winter sick rate fell to seven per cent. It was claimed that the ventilating system paid for itself in one year.

In Strouse Brothers' clothing factory, of Baltimore, the sick rate was reduced about one-half by the installation of an inferior ventilating system.

The army medical officers gave some of the earliest definite data on air quantities required in ventilation work and have furnished many illustrations of the value of ventilation, as has also the naval service. Munson records: "The medical officer at Fort Douglass, in 1898, reported an immediate decrease in the number of cases of tonsillitis among the troops at that post on installing suitable arrangements in the previously improperly ventilated barracks."

#### *Legislation as to Ventilation*

Much has been written on the value of ventilation, but little has been accomplished toward bringing adequate relief from present oppressive conditions to those who are least able to demand it, the children in the schools, the workers in the factories, and the dwellers in the congested districts.

But seven states (Massachusetts, New York, New Jersey, Pennsylvania, Virginia, Utah and Minnesota) have school ventilation laws, and but three (Connecticut, Vermont and Indiana) have state board of health rulings requiring ventilation of school buildings, but not one of them refers to the subjects of dust, humidity, or source of air supply. These laws, however, are a big step in advance, and every state should have a law at least as good. Compulsory ventilation laws are under consideration in Illinois, Indiana and Wisconsin. Twenty-one states have laws governing factory ventilation, the most of the laws referring to removal of special dust, fumes, etc., rather than to air supply, its quality or quantity, and but one law covers conditions in mercantile establishments. But very few of these laws are of real merit. A few cities have local ordinances of doubtful value. Such laws should be made to include all classes of buildings that are densely occupied, such as court houses, hospitals, asylums, reformatories, houses of refuge, prisons, schools, colleges, theatres, auditoriums, factories, stores and all places where people congregate. They should state the minimum air supply (quality and quantity) and removal, prescribe the official who has authority to administer the law, and they should



include provisions for the removal of all dusts in a sanitary manner. Humidity and temperature should be prescribed where possible.

But a very feeble beginning of a most important movement has thus far been made. It may properly be considered a form of the ever-growing police power of the people, to be exercised for the welfare of the defenseless. It should be encouraged and participated in by all those interested in the welfare of humanity, and especially those bodies having to do with the public health, the welfare of the workers and the interests of the children. Every parent has the right to demand that the school, in which the child spends approximately one-fifth of its time for a large portion of the year, be thoroughly ventilated and in sanitary condition. No hospital should be considered worthy of use or patronage in which an effort at thorough and systematic ventilation, both natural and artificial, is not fundamentally a part of the equipment and service. Constant agitation is essential in this as in other worthy reforms. The prevailing ignorance of the worth of ventilation and the indifference of the public are the greatest handicaps in the onward progress of ventilation. The physician, to the success of whose work ventilation will so largely contribute, should realize the value of ventilation. Some doctors, and among them some hospital experts, fail to recognize the limitations of natural ventilation and the need of supplementing it with an efficient artificial ventilation system.

#### *The Architect Should be Aided by the Sanitary Engineer*

It is unfortunate for the progress of ventilation that much skepticism has been aroused as to the efficacy of artificial ventilating systems because of faulty installations made in the past. The too prevalent impression that ventilation is not an exact science is largely due to the fact that owners will too often accept as an expert any plumber or steamfitter who can put out his shingle and who claims to be a heating and ventilating engineer. Ventilating work should be designed by experienced engineers who are independent of any interest in contracting work or materials, and should be installed by contractors of equal merit in their line, under the supervision of the designer.

Improper operation of systems when installed has injured the cause of ventilation. The responsibilities of operating a venti-

lating plant costing thousands of dollars, the economical or efficient use of hundreds of tons of coal, and above all the keeping of the health of hundreds of school children, or of an equal number of sick or well adults, and the custody of their working efficiency, demand higher qualifications than those necessary for the shoveling of coal and ashes or the wielding of the deadly feather duster.

The architect for a new building should be provided by the owner with the assistance of expert engineering services covering the heating, ventilating and similar equipment. For this is it just and proper that the architect be paid extra by the owner and that he should not be left dependent upon the help of contractors or manufacturers of materials whose interests are naturally not those of the owner? Too many people expect the architect to be artist, designer, constructionist, landscape gardener, civil, mechanical, electrical and sanitary engineer, chemist, lawyer, jury and judge. The erection of a modern public building involves an architectural problem dealing with design and construction, and it also involves engineering problems requiring familiarity with the entirely different problems presented by air, water and steam in their different conditions and relations to each other. In brief, one problem is architectural and another engineering in its nature, the two involving different training and experience.

What this paper has attempted to show may be summarized as follows:

1. That all the fresh air possible should be given free access to the lungs by out-of-door living, and by natural ventilation of our habitations, breezes being less to be feared than vitiated air.

2. That artificial ventilation is absolutely essential as an aid to natural ventilation, that indoors may be kept in the best condition possible, *i. e.*, as near as possible like out-of-doors.

3. That warm air (as distinguished herein from hot or superheated air) is equally as beneficial as cold air, lacking only in quantity, the matter of expense prescribing this limitation.

4. That the ventilating system which fails to take cognizance of the subjects of dust, humidity and temperature are foredoomed to failure, quality of air being quite as essential as quantity.

5. That efficient ventilating systems, fulfilling all of the above requirements, are available for all classes of buildings. The installation of such systems assumes the employment of experienced, independent engineers as distinguished from those connected with contracting or manufacturing firms.

Efficient ventilation also involves the employment of capable operating engineers, resulting in efficiency and economy.

6. That dullness, restfulness, forgetfulness and general deficiency, being incident to a weakened vitality, are the results of the ill-ventilated school-room, while a quicker perception, improved memory, increased accomplishment, vigor, health and happiness go arm in arm with ample school-room ventilation.

7. That a lengthened illness and a lessened proportion of cures are chargeable to the insufficiently ventilated hospital, while the fresh air supplied by an efficient ventilating system is the angel of health bringing relief and healing to the weakened vitality.

8. That a poorer and a smaller output and more sick employees are the result of a foul-aired factory or mercantile establishment, while ventilation means less mistakes to be corrected, less idle machinery, and the maximum efficiency of plant and employees.

9. That the general ventilation of homes would mean less colds, catarrh and other preventable ills; and of auditoriums and places of entertainment would mean greater enjoyment on the part of the audience and an appreciable reduction in headaches and enervation.

10. That the health of the individual largely determines the health of the public. The greater necessity for special ventilation where many people are assembled is due to heat and moisture given off and to the increased oxygen required.



PART THREE

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*Elimination of Disease—Physical  
Care of Individuals*





## SOCIAL SERVICE WORK IN HOSPITALS

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The promotion of public health is only part, though perhaps the largest part, of the usefulness aimed at by those who have been active in establishing social workers side by side with physicians in hospital work. The social worker is needed in the hospital to make the place less grim, to keep the standard of good manners and decency higher than it otherwise tends to be, to bring to bear upon hospital routine and hospital management the criticism of a friendly, yet keen-sighted, observer, and to focus upon each individual patient all the forces of helplessness existing in the charities, the churches, the labor unions, lodges and other voluntary associations, as well as the opportunities for recreation and education of which the patient may be especially in need.

All these types of usefulness are distinguishable from that which makes the social worker in hospitals part of the public health movement. For I take it that all activities on behalf of public health are characterized by their special interest in *prevention*, and in the *care and preservation of health in large masses of people* rather than in the individual sufferer, after sickness has invaded him. I shall leave out of account, therefore, a large part of what seem to me the most beneficent and important activities of the hospital social worker. His efforts to civilize and colonize those dreary and uncultivated wastes ordinarily known as hospitals cannot be dealt with in this article.

Some hint of the *preventive* work done by hospital social workers may be obtained from the following story: A young infant entered the wards of the Massachusetts General Hospital early one summer, a few years ago, for a stomach and bowel trouble, of the ordinary fermentative or "food" type. The baby was treated in the wards for about three weeks and perhaps thirty dollars' worth of care was expended upon it. At the end of that time it seemed entirely well and was delivered over to the mother, according to

the hospital custom, without any special instruction as to the future. The mother, therefore, continued, in the same generous and whole-hearted manner which had characterized her previous actions, to give the baby a little of everything that was going. Not many weeks passed before the baby's digestive tract was as thoroughly upset as it had been the first time and as anyone could have predicted would be the case again, if the hospital neglected its duties toward preventive medicine.

In this case the social worker undertook the instruction of the mother regarding the elementary principles of infant feeding, found her very amenable to the teaching and succeeded in this way in preventing another relapse.

The waste of money as well as of human energy and suffering entailed by the failure on the part of most hospitals to take note of the public and preventive aspects of their work, is well illustrated by the case just described. Warning and instruction as to the future is most effective when a person has just experienced in the form of disease the consequences which make the need of such instruction come home to him. Every case of disease is thus an opportunity for the prevention of further disease through the opportunities which it affords for instruction to the sufferer and to his family and friends. We have recognized this fact in relation to the object lessons presented by the out-door treatment of tuberculosis, and of the diseases of infancy. All over the country we have visiting nurses doing preventive work against tuberculosis and infant mortality in connection with hospital clinics. But we have not sufficiently realized as yet that in the functional and nervous diseases, in many affections of the joints, the gastro-intestinal tract and the circulation, almost every case which presents itself at a clinic, should be a finger-post pointing to the need of preventive work in the home. Such cases issue, in most instances, out of a hot-bed of home conditions which are bound to sprout more of the same.

At the present juncture when these opportunities for preventive work are recognized and met through district nurses only in the field of tuberculosis and infant mortality, the social worker has to pick up what is left and do the work of hygienic instruction for all the rest of the preventable diseases. Such teaching may be given at the clinic, but is usually more effective in the home where the

worker can see and attempt to overcome the special obstacles presented by housing conditions, industrial derangements and domestic friction.

Another type of preventive work which the hospital social worker finds ready to her hand, concerns the problems of industrial hygiene. Every case of lead poisoning, for example, should be the occasion and the incentive for investigation of the conditions of work which are responsible, wholly or in part, for the disease. The social worker is not content with following up the radiating suggestions of possible disease in other members of the *family* of each patient. The other members of the *trade*, perhaps similarly exposed to disease, loom up before her vision. Are the conditions of ventilation, of posture, of temperature, such as they should be in the shop where this patient works, or are they such as to be preparing, beyond reasonable doubt, a fresh supply of cases similar to that which presents itself at the clinic? Are the hours of work such as must inevitably main a certain percentage of all who undertake it? If so, it is the business of the social worker to advertise these facts and to do what she can to change them.

Besides the preventive work accomplished by the education of the patient, so that he shall not fall into similar misfortune in future, besides the warnings given to his family and, through them, to his neighborhood, I have sketched in the previous paragraph the preventive work of the hospital social worker in the field of industrial hygiene. A third opportunity for preventive work is the education of the hospital physicians. We ordinarily say very little about this part of the work which, nevertheless, is one of the most important branches. Physicians are, just now, undergoing a process of conversion or regeneration whereby the interest of the general public is becoming paramount in their work. There is no more fruitful field for such conversion than the well-equipped hospital clinic with the social worker as part of the equipment. Physicians learn all the more swiftly for not being conscious of the process. They come in time to look on each patient, not only as an opportunity for diagnosis and treatment, not only as a subject for medical instruction, but still more as a symptom of some disease in the community which, from the social point of view, is far more important than the individual sufferer. Each physician, so educated, finds his world transformed, and can never be content

again with the unmitigated medical régime. He becomes a live wire for preventive medicine.

Hospital administrators, trustees and managers are also subject to inoculation, though usually more resistant, because their contact with the social worker is less direct and less frequent. Nevertheless their influence for preventive medicine, when once they become aroused to the fact that the hospital is primarily a public servant, like the public school, is wider and deeper than that of the staff physician.

Still another group of persons, who are rapidly becoming transformed into missionaries for public health, owing to their contact with hospital social workers, is the great body of the social workers at large. Indeed they are becoming almost too medical—too exclusively hygienic in their outlook. The programs of modern charity conferences are apt to be overshadowed by topics like tuberculosis, infant mortality, venereal disease, alcoholism, industrial accidents and insanity. Preventive philanthropy has come to be practically identical with preventive medicine, and while one may regret this from the point of view of philanthropy itself, it is an enormous gain to preventive medicine. Indeed it may be said that the social workers have initiated most, if not all, of the great campaigns against disease that have been taken up in this country during the past decade.

It must be evident from what has been said that the work of the district nurse is scarcely to be distinguished from that portion of the hospital social worker's activities concerned with preventive medicine. All the so-called tuberculosis nurses, all the school-nurses, all of those engaged in the work for young infants, are busy upon the same tasks which occupy the hospital social worker, since they are supposed to instruct as well as to nurse their families, and to extend their teaching as widely as they can into the family and the neighborhood.

Considerable confusion and some bitterness arises not infrequently out of the fact just mentioned—that the social worker is often asked to do nurses' work. For the technical duties of the nurse the social worker is, of course, unfitted, and no one is more vividly aware of this fact than the nurse, who is apt, therefore, to regard the social worker as an unqualified intruder. On the other hand, the social worker herself is apt to become narrow and



distracted from her proper path, owing to the multitude of purely medical tasks which she is called upon to perform. Nevertheless there arises out of this very confusion a broadening of the ideas and methods of the nurse who absorbs, more or less unconsciously, a good deal of the social knowledge which comes to her directly from the social worker and indirectly through the socially converted doctor. Doubtless there will issue out of this confusion a new synthesis of duties, a new recognition of the fact that medical needs form the best of all points of entrance for anyone who would be a missionary or a servant of the whole life of humanity.

## MOUTH HYGIENE AND ITS RELATION TO HEALTH

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There is not any one single thing more important to the public in the whole range of hygiene than the hygiene of the mouth. If I were asked to say whether more physical deterioration was produced by alcohol or by defective teeth, I should imhesitatingly say defective teeth.—*William Osler, M. D.*

There is probably no people who, as a whole, give as much attention to mouth hygiene as do Americans, and though their susceptibility to dental diseases is high, it is not higher than that of other nations who exereise little or no care. Onè explanation of this high suseptibility will be found in the enormous amount of sugar which we consume as a nation, reported in 1906 as being 6,450,653,967 pounds, or about 92½ pounds per eapita, fifteen pounds higher than that of Great Britain, our closest competitor. And yet, with all our boasted pre-eminence, we are as a nation lamentably ignorant of the first prinieiples of what constitutes mouth hygiene.

Nor are we one whit less ignorant regarding the pernicious effect of mouth infection upon our national health. It has been said that nowhere in the human body will so much filth be tolerated as in the mouth, the avenue through which must pass all food, upon which depends the nourishment of the body and the maintenance of health.

The number of people in the United States, who patronize the dentist, execept for the oecasional extraction of a tooth, has been variously estimated at from four to ten per cent. If these figures be true, it means that there are not less than seventy-five million people in this country who give little or no attention to mouth hygiene.

Under the most favorable conditions the mouth may be regarded as being an almost ideal culture medium for germ life. In fact, it presents in point of temperature, moisture, nutritive material, etc., an almost perfect breeding-place. Upward of twenty varieties, many of them pathogenic (disease-produing) in their nature, have been found to be normal residents of the mouth under certain conditions. Among these may be mentioned the streptococcus and

staphylococcus, both pus producers, and always present in the mouth in greater or less numbers, the pneumococcus, the causative agent in pneumonia, and also a frequent resident of the mouth, the dreaded tubercle bacillus and Vincent's fusiform bacillus, only to mention a few of the more virulent types. One investigator who has given years to the study of mouth bacteria has estimated the number of germs in one unclean mouth at 1,140,000,000.

Many of the diseases of the mouth are directly or indirectly caused through the agency of these germs. Fortunately, for humanity, nature has provided the mouth with soft tissues that are unusually resistant to infection. Every one knows that a wound in the mouth, such for example as that caused by the extraction of a tooth, rarely becomes infected, notwithstanding the fact that it may be constantly bathed with organisms that under other circumstances might cause serious infection. It is true that fatalities from such causes are not unknown when for some reason the resistance to infection is low, but they are comparatively rare.

While the local penalties attached to an unsanitary mouth are sufficiently grave to warrant serious consideration, they are as nothing to those which they inflict upon the general health. We have too long considered the mouth as an independent entity, forgetting that here it is that the first steps in digestion are taken—the only steps, in fact, over which we have the slightest control. Not only is it important that food be thoroughly masticated, which is impossible without sound and healthy teeth, but it is equally important that the mouth in which mastication takes place be a clean mouth.

*Factors in an Unclean Mouth.* Among the factors which make for an unclean mouth may be mentioned caries of the teeth, pyorrhea alveolaris or so-called "Riggs Disease," chronic abscesses, commonly called ulcerated teeth, or gum boils, irregular or mal-posed teeth, partially erupted "wisdom teeth," deposits of salivary tartar, inflamed and bleeding gums, the habitual use of tobacco, ill-fitting artificial teeth, such as crowns, bridges, plates, etc.

*Decay of the Teeth.* Of all these, the most common, and probably the most pernicious in its effect upon the hygiene of the mouth, is caries of the teeth. So nearly universal an affection is this that it has been characterized "The Peoples' Disease." Few individuals or nations escape its ravages. So far as is at present known, the Esquimaux, certain tribes of American Indians, the Icelanders, the

Lapps, the Igorots (all more or less completely outside the influence of civilization) are the only people who are more or less exempt from dental caries.

Like many another disease, it is brought about through the agency of micro-organisms, and in this instance micro-organisms resident within the mouth. These germs possess the property under favorable circumstances of converting carbohydrates (starchy foods, sugars, etc.) into acids, which in turn dissolve out the lime salts of the enamel, and this notwithstanding the fact that the enamel is the hardest tissue within the body, not less than 97 per cent. of it being inorganic.

The rapidity with which this phenomenon is accomplished will depend upon the number of organisms present, the cleanliness or uncleanness of the mouth, and the resistance which the teeth, or the body as a whole, offers to their activity. Once the solution of the enamel has taken place, and the dentine, containing 28 per cent. of organic material, is exposed to the combined influence of germs and acid, the progress of the disease becomes more rapid, it being then only a question of time, unless interfered with, when the pulp of the tooth becomes involved, followed by pain, death of the pulp and eventual loss of the tooth. Thus it will be seen that the progress of the disease is comparatively slow, that decay which has progressed to the point of pain is not a matter of days or weeks, but rather of months or years. An aching tooth does not spring into being in a day, and means nothing less than negligence long continued. While caries of the teeth is not limited to any age, and may afflict any one between infancy and old age, it is, nevertheless, essentially a disease of childhood, its most active period being between the ages of six and twenty. If its ravages could be prevented during this active period, the dental ills of adult life would, with proper care, be very materially reduced. The menace in bad teeth cannot but be apparent to any one who has given the subject any consideration whatever, and especially is it pernicious in its influence upon the health and efficiency of the growing child. Decaying teeth render thorough mastication impossible, and establishes early in life the habit of bolting the food—a habit which may continue throughout life. Moreover, the filth which is inseparable from decaying teeth and neglected mouth hygiene is mixed with the food, and carried into the stomach as a further tax upon the digestive apparatus. In

a word, decaying teeth, especially in the mouth of a child, spells poor nutrition, and poor nutrition means poor health and a low order of efficiency.

*Pyorrhea Alveolaris (Riggs Disease).* If decaying teeth is essentially a disease of childhood, pyorrhea alveolaris may be said to be essentially a disease of adult life. Among adults, in some form, it is very common, and is responsible for the loss of many otherwise healthy teeth, and the indirect cause of not a few ills more or less seriously affecting general health. The disease attacks the tissues supporting the teeth, involving the pericemental membrane, bony socket and gums, and is characterized by loosening of the teeth, inflammation and recession of the gums, necrosis of the bony walls surrounding the teeth, and, in most instances, a discharge of pus at the free margin of the gums. This discharge is more or less persistent, the amount depending upon the number of teeth involved, the advanced stage of the disease and the nature of the infecting organisms. In its early stages there is little to attract the attention of the patient. It is only when the disease becomes well advanced on one or more of the teeth that the patient's attention is attracted to it. Then it is that there will be noticed a slight loosening of the affected teeth, with possible elongation, sensitiveness to heat and cold, sweets and acids; pain on mastication; periodic and painful swelling of the gums, due to infection, etc. One or all of these symptoms may be present, their severity depending largely upon the stage of the disease. Pyorrhea alveolaris, is, first, last and all the time, a filth disease, encouraging the growth of pyogenic (pus-producing) organisms, permitting the lodgment of particles of food between the loosened teeth, and discharging its purulent matter into the mouth with every act of mastication. A condition such as this means not only an unclean and unhealthy mouth, with ultimate loss of the teeth, but means also eventual impairment of the health. As a causative factor in gastro-intestinal diseases, pernicious anemia and arterio-sclerosis (hardening of the arteries)—only to mention some of the more obvious results of mouth infection—pyorrhea alveolaris has never received the attention which its importance demands. If its presence in the mouth were a matter of weeks or months only, its effect upon general health might be ignored, but when it is remembered that not infrequently it may, because of its chronic nature, persist almost throughout adult life,



and that without more than occasional painful symptoms, one is made to realize that it is a disease which merits serious consideration.<sup>1</sup>

*Chronic Alveolar Abscesses.* Perhaps the third most potent factor in an unclean mouth is alveolar abscesses, commonly referred to as ulcerated teeth, or gum boils. These are common to all ages, from the time the temporary teeth are erupted and as long as any teeth remain. They are always, with rare exceptions, caused through a neglect to properly care for a decaying tooth in its early stages. Decay having been allowed to progress from its early manifestations through various stages until the pulp, situated in the center of the tooth and root, and containing arteries, veins, nerves and connective tissue, becomes involved by the germs of decay; death of the tooth follows. Unless recognized, and proper treatment instituted, gangrene of the pulp takes place, followed by a discharge of the products of decomposition through the end of the root into the surrounding tissues.

Infection takes place, followed in most instances by acute pain, elongation of the affected tooth, swelling of the face, and eventual discharge of pus, usually within the mouth. These symptoms last two or three days, and are accompanied by an elevation of temperature, loss of appetite, digestive disturbance, etc. With the discharge of pus, the acute symptoms subside, and all that remains as evidence of the abscess is the opening through which the pus discharged itself. Occasionally this occurs without pain, but in both instances the results are the same, viz., a chronic sinus or gumboil, which, as long as the cause remains, will continue to discharge. As the point of discharge is usually within the mouth, this discharge, accompanied as it is with virulent pus-producing organisms, usually the streptococcus, finds its way into the stomach, to be resorbed into the circulation. Treatment consists in the removal of the gangrenous tooth pulp, disinfection of the roots, and filling of the tooth. Such abscesses are very common among children as a result of the decay of their temporary teeth, eight of which are not succeeded by their permanent successors until the twelfth year. Right here let it be said with all possible emphasis that these temporary teeth should be preserved against decay until such time as they are succeeded by the permanent teeth, not only to insure against abscesses, but for the purpose of providing the developing child with an efficient masticating

<sup>1</sup> See *International Clinics*, Vol. 3, page 77.

apparatus. How often is one told that because these are temporary teeth they are entitled to no consideration, with the result that their loss is looked upon with indifference. No greater mistake could be made, for it means not only an unclean and diseased mouth at a critical period in the life of the child, but it means inevitable irregularity of the permanent teeth. Abscesses such as these are very common, even among people who give more or less care to the hygiene of their mouth. In their chronic form they cause little or no pain; the discharge at any one time is small, and their presence is viewed with unconcern. As a result, they are allowed to remain year after year, discharging their poisonous products into the mouth—only one of the several agencies which contribute to its uncleanness.

*Other Factors Which Make for an Unclean Mouth.* Among the other causes which interfere with mouth hygiene may be mentioned irregular teeth, ill-fitting artificial teeth, salivary tartar, the habitual use of tobacco, etc. If for no other reason than that it contributes to mouth hygiene, teeth that are markedly irregular should be placed in their normal positions. With modern facilities, this can be done without in the least interfering with the health or vocation of the child. Such treatment not only adds greatly to the appearance, but renders the teeth less susceptible to decay.

Because people are prone to regard artificial substitutes for teeth quite as satisfactory in the mastication of food as natural ones, and less liable to cause pain, they have neglected the care of their own teeth, and filled their mouth with all manner of crowns, bridges and plates, forgetting that with each addition of this kind, especially non-removable appliances, they have only increased the difficulties in the way of a clean mouth. By actual comparison artificial teeth have been found to be ten times less efficient in the mastication of food than are sound natural teeth. They sustain about the same relation to natural teeth that a wooden leg does to one of flesh and bones. Moreover, their esthetic value is always low. Great care should, therefore, be exercised to preserve one's own teeth, not only because it is easier to keep natural teeth clean, but because of their greater efficiency as organs of mastication.

If no other charge could be brought against the habitual use of tobacco other than that it contributes to the uncleanness of the mouth, it would be enough to condemn its use. The belief, shared

by so many, that it preserves the teeth against decay is without foundation. Its effect is to discolor the teeth, to add to the general uncleanness of the mouth, and to injure the gums and mucous membrane of the mouth and throat. Smoking, especially pipe-smoking is the most common cause of leucoplakia of the mouth, a disease which is always dangerous because of its tendency to break down and become malignant.

*Some of the Systemic Effects of Mouth Infection.* In a word, then, decaying teeth, pyorrhea alveolaris, chronic abscesses, irregular teeth, tobacco, artificial substitutes for teeth, etc., are, one and all, prejudicial to mouth hygiene. Moreover, only when it is realized that not only may one, two or three of these agencies of filth be present in any given mouth, but that they may all be present at one and the same time, is one able to appreciate the possible ill effects of such conditions upon the health of the individual. Some of the ways in which the pathogenic organisms of the mouth gain entrance to the body, with possible serious results, may be enumerated as follows:

1st. Infections caused by a breach in the continuity of the mucous membrane of the mouth, brought about by mechanical injuries, wounds, extractions, etc. These lead either to local or general disturbances.

2d. Infections through the medium of gangrenous tooth pulps. These usually lead to the formation of abscesses at the point of infection, but also occasionally to secondary septicemias and pyemia, with fatal termination.

3d. Disturbances caused by the resorption of poisonous waste products formed by bacteria.

4th. Pulmonary diseases caused by the inspiration of particles of slime, small pieces of tartar, etc., containing bacteria.

5th. Excessive fermentative processes and other complaints of the digestive tract caused by the continual swallowing of microbes and their poisonous products.

6th. Infections of the intact soft tissues of the oral and pharyngeal cavities, whose powers of resistance have been impaired by debilitating diseases, mechanical irritations, etc.<sup>2</sup>

Nor should there be overlooked, in this connection, the possibility of an infection by the accumulation of the excitants of diphtheria, typhus, syphilis, etc., within the mouth itself. That the rela-

<sup>2</sup> "The Micro-Organisms of the Human Mouth," P. 274.

tion existing between an unclean mouth and other complaints has not long ago been emphasized, is explained by the fact that the mouth, as a source of disease, has never received the attention which its importance deserves, and though there are some who at present recognize this relation, there are many more who give it no consideration whatever.

In the introduction to his book on "Oral Sepsis as a Cause of Disease," William Hunter, M. D., F. R. C. P., has this to say relative to the influence of an unclean mouth upon the health of the body as a whole: "I desire here to point out how common a cause of disease it is, how grave are its effects, how constantly it is overlooked, and what remarkably beneficial results can be got from its removal. What I wish to emphasize is that it is not the stomatitis, or the dental caries, or the absence of teeth, or any disturbance of nutrition in connection with defective teeth that causes all these effects. The condition in one and all is that of profound sepsis; that is to say, we are dealing with pus-forming organisms which are constantly present in the mouth in connection with necrosed teeth."

He sums up his observations regarding the influence of such conditions upon the health of the individual in the following words:

(1) The condition of mouth, associated with the presence of decayed teeth and rotten fangs, is not simply a want of teeth, but is a condition of profound sepsis; and that, too, irrespective of any pain or discomfort they may have from time to time caused, or even of the entire absence of such pain.

(2) The sepsis, moreover, is one differing from ordinary surgical sepsis, inasmuch as all the pus organisms are continuously being swallowed, probably over a period of many years.

(3) Further, it is a sepsis connected with diseased bone (*i. e.*, tooth) than which there is no more virulent form.

(4) While the gastric juice has fortunately a great capacity for killing organisms this capacity is not complete even in health, in the intervals between food when the acidity of the juice is at a minimum.

(5) The continuous influx of pus organisms from diseased teeth and gums must be a source of disturbance to the mucosa, causing catarrh and diminished gastric secretion.

(6) When we have diminished acidity of gastric juice, with increased influx of organisms, we have the two conditions—diminished resisting power and increase of dose—which all pathological knowledge shows to be the two chief conditions underlying infection.

(7) Consequently, the gastric catarrh becomes really a septic catarrh, due to invasion of the mucosa with septic organisms.

(8) Further, apart altogether from its gastric effects, a continued production of pus in the mouth must be a source of danger in other ways.

(9) The mere septic absorption from such teeth and gums must be very considerable, lasting as it does over many years.

(10) The sallow look and languid feelings of which the patient complains, and which he and his physicians agree in referring to his chronic indigestion, are really the expression of this septic absorption.

(11) If pus organisms are constantly being swallowed there is a risk of their infecting the tonsil over which they must pass, and hence tonsillitic, pharyngeal and Eustachian tube infection may from time to time occur.

(12) Even apart from such local effects there must always be a certain risk connected with the absorption into the blood of such organisms from fungating gums around diseased teeth; and, if other conditions are favorable, there may be infection from the blood—*e. g.*, ulcerative endocarditis, empyemata, meningitis, osteomyelitis, etc.

(13) In short, while every care has been and is being taken in increasing degree to protect the public from notorious disease-producing organisms, such as typhoid or tubercle bacilli, whether in the air it breathes, the food it takes, the water it drinks; and the utmost care is even taken by habits of cleanliness or stringent surgical precautions to protect any introduction of ordinary septic organisms by the skin—the mouth alone is disregarded and the patient is left with a permanent condition of sepsis, which, did it exist in any other part of the body, would at once receive immediate attention.

Regarding the influence of mouth sepsis upon the respiratory apparatus, Wadsworth says:<sup>3</sup> "From the hygienic standpoint, the secretions of the mouth constitute the chief, if not the only, source of respiratory infections, and this infectious material is transferred from one person to another, in some cases through the air, as from sneezing or coughing, and to an even more serious extent by personal contact, or by the use in common of the various accessories of life."

*The Prevention of Mouth Diseases.* To cure disease has been characterized as the voice of the past; to prevent it as the divine whisper of the present.

People are everywhere coming to understand that most of the diseases affecting mankind are, to a considerable extent, preventable diseases, and are turning deaf ears toward the voice of the past, while intently listening to the whispered voice of the present.

*Prevention of Caries.* Perhaps in nothing is the ounce of prevention of more value than in the treatment of dental diseases.

<sup>3</sup> *Infectious Diseases.* Oct., 1906.



Just how far caries of the teeth can be prevented, it is impossible to say.

There are individuals who are immune in spite of neglect, just as there are individuals whose teeth decay, because of a high susceptibility, in spite of every care, clearly proving that there are other factors than cleanliness to be considered in the prevention of the Peoples' Disease."

There is one thing, however, which may be regarded as axiomatic—the cleaner is the mouth, the less subject will the teeth be to decay, other things being equal. Dr. Ch. L. Quincero<sup>4</sup> says on this point: "Etiologically, an unclean condition of the oral cavity is the principal factor in the production of dental caries. While admitting that a certain number of predisposing factors, such as sex, age, constitution, heredity and defects of structure, aggravate the production of caries, in the majority of cases uncleanness is the initial cause."

In the prevention of caries, obviously, the first requisite is a clean mouth. To accomplish this, the teeth should be brushed with a carefully selected brush, at least twice daily, with a dentifrice the ingredients of which are known. Too many people are willing to use a dentifrice solely on the recommendation of the manufacturer, who probably knows nothing of what is required in such a preparation, and whose only interest is in the profits.

Most of the toothbrushes upon the market are poorly adapted to the proper cleansing of the mouth and teeth, being too large and of improper shape. A small brush of good quality and medium stiffness should be employed. The teeth should be brushed in an up-and-down direction, never across, allowing the brush to pass well up over the gums on the external surface of all the teeth. The mouth should then be opened, and the grinding surfaces of the teeth thoroughly brushed, especial care being given to those in the back part of the mouth. Then, by tilting the brush, cleanse the inner surfaces of the teeth, again allowing the brush to come against the gums in the form of a massage. The tongue should then be extended from the mouth and carefully brushed. After meals, whenever possible, the mouth should be flushed with warm water and the teeth brushed, for the purpose of removing particles of food. The waxed silk, or, better, the waxed silk tape more recently placed on the market,

<sup>4</sup> *Le Monde Dentaire*, Paris, Jan., 1909.

should be passed back and forth between the teeth, not only for the purpose of removing particles of food which may have wedged between them, but for the purpose of breaking up the small gelatinous plaques which form in these spaces, and under cover of which the micro-organisms carry on their tooth-destroying activities.

The busy man will raise the objection that all this takes time. So it does, and so does anything that is worth while. But it will also save time. To prevent teeth from decaying will always consume less time than does the repairing of them. Moreover, it will pay 100 per cent. in comfort, health and masticating efficiency, not to mention the saving in dental bills. It is not half so much reparative dentistry that the public is in need of to-day as it is preventive dentistry.

Another potent factor in tooth decay is the lack of exercise given the teeth in mastication. One has only to observe the people in a public dining-room to be impressed with how little *real* use is made of the teeth. The way in which food is now prepared has much to do with this, but decaying teeth, lack of teeth, and habit have more. Good, vigorous use of the teeth in the mastication of food not only goes a long way toward keeping them clean, but it also adds appreciably to their immunity from decay.

Viewed solely in its relation to mouth hygiene, the gospel of physiological mastication, so ably preached by Horace Fletcher, is one which could be practiced by every one with increasing benefit. A high standard of health will also operate in reducing the susceptibility to caries of the teeth.

It must not be inferred from the foregoing that caries of the teeth can be entirely prevented. Unfortunately, we can only hope in cases of great susceptibility to limit the disease. The family dentist will still remain a family necessity, but his services should be sought not alone for the purpose of repairing the devastating effects of this disease, but as a supplemental aid in its prevention. Caries, like most of the other diseases of the mouth, can, in its incipency, be easily and effectually arrested, and this without in the least impairing the usefulness of the teeth as organs of mastication, hence the importance of discovering its presence early. Until the laws governing susceptibility and immunity to disease are better understood than they are at present, frequent visits to the dentist in the interest of prevention should, therefore, be encouraged.

*Pyorrhea Alveolaris—Its Prevention.* Like caries of the teeth, pyorrhea alveolaris can, to a considerable extent, be prevented, providing proper attention is given to mouth hygiene. In fact, its prevention is more certain than is that of caries. Its causes are many; among them being irritation at the free margin of the gums, wedging of food between the teeth, tartar, poorly fitting artificial crowns, general uncleanness of the mouth, overuse or disuse of the teeth, irregular teeth and certain systemic conditions which predispose to the disease.

Its progress is slow, and in its beginning it is easily cured. In fact, it may be said to be always curable so long as there remains sufficient tissue to support the teeth after the disease has been eradicated. This is emphasized here because it is so often said to be incurable, and so often believed to be true. Its influence upon the health is always bad, though not always obvious.

*The Chronic Abscess—Its Prevention.* The chronic alveolar abscess, above described, could be entirely prevented if decay of the teeth was checked in its incipency—a further argument in favor of early treatment where prevention fails. A living tooth will never become the seat of an abscess. Only “dead teeth ulcerate.” Under no circumstances should their presence be tolerated, as their cure is usually not difficult.

*The Dental Needs of School Children.* As decay of the teeth is peculiarly a disease of childhood, manifesting itself as early as the third year, so it is the most common. Practically no child escapes its ravages. It may, therefore, be said without fear of contradiction that the average person who has given no attention to mouth hygiene is, at twenty years of age, from a dental standpoint, a lost cause. Certain it is that he will already have lost several teeth, while others will have become so weakened by long-neglected decay as to render the hope of permanently saving them extremely doubtful. The following case will serve to illustrate this point: While engaged in writing the foregoing paragraph, there was sent to the author by the Charity Organization Society of this city a girl of nineteen, for examination and advice as to what should be done for her in the way of mouth hygiene. An examination of her mouth revealed the fact that she had already lost seven teeth through extraction (two of them being the upper central incisors), while the decaying roots of five others were all that was visible above the gum line, meaning

that in any course of treatment these must also be extracted. In the remaining sixteen teeth (for the "wisdom teeth" had not yet erupted), there were twenty-two carious cavities requiring immediate attention if these teeth were to be saved. The whole mouth was foul in the extreme, the patient admitting that she did not use a toothbrush, as in their present condition the teeth were so sensitive as to make its use extremely painful, which was probably true. Some of the evil consequences of this long-continued neglect were already apparent, in the highly inflamed gums, enlarged tonsils and cervical lymph nodes, and in the ashy pallor so characteristic of mouth infection. Assuming that this girl could now avail herself of all that modern dentistry could give, her loss would still be an irreparable one. And when one considers the necessary time, expense and pain involved in such treatment, and compare it with the small expense and practically no pain attendant upon preventive treatment persisted in from childhood, a treatment which would have insured against the loss of a single tooth, the value of early treatment cannot but be apparent to all. This is no exceptional case. Perhaps no better proof of this could be given than that furnished by a report of an examination<sup>5</sup> made of five hundred public school children applying to the Board of Health in New York City for their mercantile certificates in the spring of 1909. These children represented a large number of the public schools of the city, and it is probable that the condition of their mouths was fairly indicative of that which prevails throughout the schools of the city. It was found that not one had what might be regarded as a decently clean mouth. Four hundred and eighty-six of their number had decaying teeth, 642 of which had already been extracted, or were so badly decayed as to make extraction necessary. There were 2808 decaying teeth in their mouths, many of which could only be saved by prompt attention. But twenty-five of their number had ever been to a dentist except for tooth extraction. The use of the toothbrush was practically unknown among them. And this, it must be remembered, among children the oldest of whom was but sixteen years of age. Investigations made in other cities would seem to indicate that these figures are fairly representative of the dental needs of the children in our public schools throughout the country.

*Effects of Mouth Infection Upon Child Life.* As it is the child

<sup>5</sup> By Wallace T. Van Winkle, D.D.S., N. Y.

who is most susceptible to caries of the teeth, so it is the child who is the greatest sufferer, and not only is this true regarding the local effect of caries, but especially is it true of its influence upon the health and efficiency of the developing child. Of the effects of mouth infection upon the health of the child, Henry G. Langworthy, M. D.,<sup>6</sup> says: "Contamination of food is important in causing decay of food within the body, the poisons of which frequently cause secondary gastric catarrh, various forms of auto-intoxication, anemia, nervous debility and appendicitis. A foul mouth and decaying teeth, *particularly in children*, decidedly increase the chances of catching such contagious and infectious diseases as scarlet fever, diphtheria, measles and tuberculosis. A clean mouth will do much to prevent tubercle bacilli from gaining a foothold in the body." Not less than 40 per cent of the absentees from school are caused by toothache or other equally preventable dental ills and their sequelæ.<sup>7</sup>

In a public address made before the Dental Hygiene Conference held in New York City in May, 1910, Luther H. Gulick, M. D., formerly physical director of the public schools, and at present head of the Division of Child Hygiene in the Russell Sage Foundation, said that investigation had shown that it takes children with defective teeth at least six months longer to complete the eight common-school grades than it does those without defective teeth. Such observations have been made by other investigators.

*Need of Public Dental Dispensaries.* One thing is certain: If the teeth of the present generation are to be saved, it must be done during their school life. To defer it until they have taken upon themselves the responsibilities of adult life will be too late. Caries will already have done its work. What per cent. of the parents of the children in our public schools are able to provide adequate dental treatment for their children when taught its value, no one can tell. But whatever it may be, there will inevitably remain a vast multitude of children who must depend upon the dispensary for all needed dental treatment. And, curiously enough, there are at present no such dispensaries. Scarcely a hospital in the United States has an adequately equipped dental department. It is true there are a few dental clinics in some of our larger cities, which

<sup>6</sup> Dental Cosmos. Vol. 51, page 705.

<sup>7</sup> John J. Cronin, M.D., Asst. Chief Med. Insp. Div. Child Hygiene. Board of Health N. Y. City.



have sprung into being within the past few years, but not one of them is equipped to meet the needs of the community in which it is located, unless we except the one being built in Boston, and made possible by the Forsythe gift of \$1,200,000. There is not a city in the United States which does not need such a dispensary to meet the needs of the children in its own public schools. Germany has already recognized this need, and made provisions to meet it by the establishment of free dispensaries in upward of thirty of its cities, where free dental treatment is furnished to the children of the public schools. In most instances these are supported by the municipalities in which they are located.

*The Need of Co-operation.* Obviously, the first step toward the achievement of this much-needed reform in the United States is the education of the public in matters affecting the health of the mouth, with a view to limiting the spread of dental diseases, as far as that is possible through preventive measures, and the arrest of such as are not prevented by early treatment. The responsibility for the inauguration of such a campaign rests squarely upon the shoulders of the dental profession. It is they who know better than any other group of men the value of a clean mouth in its relation to health. As a result, there is scarcely a dental organization throughout the country—national, state or local—in which an organized effort is not being made to spread the gospel of clean mouths. But this is not enough. As a public health measure, the problem is unlike any other ever before offered for consideration. The universality of the disease, the vast numbers involved, the rapidity with which caries causes the destruction of the teeth, especially in childhood; the amount of time involved in dental operations all conspire to make its solution a difficult one. They must have, in this campaign, the co-operation of every one who has to do with child life—parent, teacher, physician, nurse, social worker—wherever he or she may be, throughout the length and breadth of the land. Nor is this enough. It is absolutely essential, if any adequate step is ever taken to meet this need, that they have the co-operation of the municipality, state and nation, for it is only through such co-operation that they can ever hope successfully to cope with the appalling conditions existing among the children of our public schools.

## THE PHYSICAL CARE OF CHILDREN

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The physical care of children has developed from the academic subject of school hygiene taught by pedagogues, with inaccurate knowledge and weak force, into several well-developed specialized lines of work, each an active force. Chief among these are the medical inspection of school children, the provision of playgrounds and free medical treatment, and the enactment of laws calculated to prevent, or at least decrease, child labor.

Taking up these subjects seriatim, and considering first the medical inspection of children in the schools, we find its reason for existence in the fact that the eight years of school life offer the only opportunity to the community to examine all its members. Such inspection has a double interest, that of the physical health of the community and that of the intelligence of the community, since doctors have come to realize that physical health is a strong factor for or against mental development.

The medical inspection of school children was first instituted in America, on a large scale, by the health department of the city of New York, which, in 1905, appointed medical inspectors to examine all of the school children of the city. I am glad to say that the first honor of medical inspection apparently belongs to my own city of Philadelphia, whose board of education many years ago, at the instance of Dr. Samuel D. Risley, commissioned him and three other physicians to test the vision of the children in the schools. Unfortunately, however, a certain opposition developed on the part of the parents, and for want of vigorous championship the work was allowed to drop. Since that time, in various cities, directors of school inspection have succeeded in having the work done upon a small scale; but the comprehensive system instituted in New York, which has already been mentioned, marks the first noteworthy and permanent step along this line.

That there is reason for medical inspection is easily shown by the numerous statistics compiled by the examiners of children; the figures here given may be accepted without hesitancy by the reader. Eye strain exists in about twenty-five to thirty per cent. of all school children, meaning by eye strain, all cases of defective vision from refractive error, and those cases of normal vision in which such vision is accomplished only by labored effort and headaches and tiring over the eyes. The simple test of medical inspection procured detailed statements of hyperopia, myopia, astigmatism and muscular insufficiency.

Diseases of the nose and throat exist numerously in young children, particularly those of the poorer classes, whose unhygienic home surroundings act as predisposing causes. Of these defects, nasal obstruction (mostly by adenoids) exist in from six to twenty-five per cent. of the school children, according to the age and social condition, younger children and poorer children being those most affected. The large tonsils, which are frequently associated with adenoids, and which really signify chronic inflammation, as well as enlargement, are found in from three to ten per cent. of school children, the number depending upon the factors just noted in connection with nasal obstruction. Defective hearing exists, in one ear at least, in about five per cent. of all children; such prevalence, however, being quite variable at different times, owing to the fact that the catarrh, which usually causes deafness, is more prevalent at some seasons than others.

Decayed teeth are very numerous in young children, particularly those of the poor, who do not know a tooth brush and whose nutrition is low; and over two-thirds of the children between the ages of seven and nine years possess such defects. Defects of the tenth year, or temporary teeth, are less, and children for a brief period present but little dental decay until the thirteenth or fourteenth year is reached, when permanent teeth begin to break down, also. Among the older grammar children, twenty-five or thirty per cent. show carious teeth.

Among the orthopædic defects, stoop shoulders and lateral curvature of the spine command attention, because of their great frequency. Stoop shoulders, with its associated flat chest, are usually due to defective vision or defective hearing, which causes

the child to lean forward to see and hear; to nasal obstruction and poor nutrition, which rob the child of vitality and cause it to slouch as it sits; and to ill-fitting school desks and seats. Lateral curvature is an extremely common defect, but usually exists in but small degree.

Nervous disorders include, principally, chorea, which is the most manifest evidence of increased sensitiveness, quick fatigue and poor emotional control, which are the fundamental conditions underlying an exhausted nervous system. Poor nutrition exists largely, but not according to the statements of the investigator. Many statements, which have appeared in magazines and newspapers to the effect that thousands of children are in a condition of semi-starvation, are doubtless exaggerations, but no one who has been in actual contact with the children of the poor foreign districts of a great city fails to recognize that, regardless of the actual weight and height of such children, they show a decided lack of vigor and flabbiness of tissue, due to the use of improper food.

Correction of these defects just enumerated has proceeded so far by reason of the efforts of medical inspectors, appointed either by the health or educational authorities, with the assistance, in many cases, of social visitors (usually nurses), and the valuable assistance of free medical and dental treatment. The physical education of children, and the institution of playgrounds and recreation centers, may also be considered as important aids in this work, but so far they have had but little direct relation with the work of medical inspection.

Arguments bearing upon the proper appointive power, salary, hours of service, tenure of office, and special training of medical inspectors are exceedingly interesting and important to those directly concerned in the carrying on of this work, but are too administrative in character to receive attention here.

The object of medical inspection is two-fold. First, the prevention of contagious diseases; and, second, the correction of existing physical defects. The latter, it will be noted, partakes at the same time of the character of corrective and preventive medicine, since the early correction of a physical defect signifies, in many cases, the prevention of a secondary one.

It is interesting to note that the medical inspection of the

New York school children was originally planned by Doctor Darlington, as a measure for the saving of school time for those children who are excluded from school by reason of minor contagious diseases; the reasoning being that the exclusion of a child for uncleanness, pediculosis, ring worm, etc., is necessary; but, if carelessly done by the authorities, is a source of long absence from school. The realization that the correction of physical defects is much more important than the cure of minor parasitic diseases came to the authorities subsequent to the actual introduction of medical inspection.

The actual work of medical inspection is conducted by assigning to each inspector, in the case of the schools of a large city at least, a certain number of schools. Over these schools he exercises jurisdiction as health officer, occasionally excluding children suffering from contagious diseases; daily examining, at the request of teachers, children suspected by the latter of various physical defects; and, finally, examining each child in his group of schools in a systematic manner, so that defects of the eye, ear, nose, throat, teeth, skeleton, skin and nervous system are found. The number of children assigned to one inspector may roughly be set down as from four to five thousand. The children in the slum districts need more medical inspectors than those in the better residence districts. It is the custom, in Philadelphia at least, for the inspector to visit all of his schools every morning, stay a short time at each to examine any incidental cases brought to his attention, and, at the last school visited, to systematically examine twenty children. By this means, in a school year of two hundred days, four thousand children are systematically examined. It may be noted that this is a maximum figure, since the month of September is largely consumed in examining vaccination marks of new children, and the month of June naturally marks the cessation of health activities, because of approaching examinations.

The method of examination pursued by a medical inspector in a systematic examination of children is worth noting. The child is first asked to read the letters on the test card for vision, and his acuity of vision, as well as the frequent existence of headache and eye-tire is noted. If the child shows a squint, or if he wears eyeglasses, these facts are noted also. The examination



of the nose and throat and of the freedom in nose respiration is next made, together with an inspection of the teeth. Following this, the heart is tested, usually by means of a watch in the hands of the examiner, the child's eyes being in the meanwhile closed. Poor nutrition is detected by general inspection, and the child's manner of answering and general demeanor suffices, by necessity, for the detection of a run-down nervous system.

The clerical and administrative work following the examination of children consists in the recording of the defects found, and the institution of measures looking to their correction.

The matter of record keeping is extremely important, since the systematic and business-like conduct of any work undertaken on a large scale is vital. Medical inspection records are essentially of three kinds: The child's individual record, showing his physical condition; a list of the defective children in the school, together with the defects found; and a summary, or report, of the defects found and work done.

As to the child's individual record, it is essential that this record should accompany him throughout his school life, so that teacher, parent and inspector may be kept aware of his physical condition, and, in the event of sickness and poor scholarship, be apprised of the physical defect which so often has caused these troubles. It is unfortunate at the present time that our school authorities do not recognize the value of these records along the lines just mentioned. For it is certain that not one teacher in twenty has any idea, after medical inspection of her class, as to which children have been found defective and which have not. Possibly the day will come when teachers are compelled to be familiar with the physical condition of every child, and supervising principals will understand that "supervision" means the knowledge of the health and home environment of every backward or delinquent child, with a responsibility, for the endeavor at least, to correct such conditions.

The record cards should contain the record of physical examinations made yearly or biennially or triennially, as the case may be, and the record of each examination should carry with it, not only the defects found, but the date on which the parents were notified of the existence of the defect, and whether or not such defect was corrected by them. In this way, quick reference

can be had to the whole matter, and at the time of the second examination of the child the inspector knows at once, by reason of the record, whether the child has been found defective, and whether or not the parents are careful or neglectful.

The correction of physical defects found by the medical inspector has been, up to the present time, optional on the part of the parents, and it is worthy of note, therefore, that the official methods of correction are only those of persuasion. Possibly the day will come when cases of flagrant parental neglect, such as the failure to properly feed poorly nourished children, to provide eyeglasses for a squinting child, or procure medical treatment for a bad case of adenoids, with its train of secondary effects, will be the basis of prosecution by the legal officers of the community. Certain it is that a puddle in the back alley, which may be proceeded against as a nuisance, or the keeping of chickens in a cellar, which may be the basis of complaint by the Society for Prevention of Cruelty to Animals, do not compare in their injurious effects with the presence of a serious defect in a child, which daily lowers its vitality, dulls its vision, or permanently blemishes its personal appearance.

The method of correction has principally been by means of parents' notices, which are most efficient when specific in character. These special notices for eye-strain, nasal obstruction, decayed teeth and stoop shoulders produce results because of the warning information attached, when a simple blank form, merely specifying the defect, fails of its purpose. However, just as personal salesmanship produces business where impersonal advertisements fail, so the home visitor, usually a school nurse, secures the correction of many defects which are otherwise ignored by the parent. In this connection it is worth while noting that, without a nurse, the proportion of defects corrected usually is from five to thirty per cent, according to the zeal and intelligence of the inspector; while, with the aid of a home visitor, medical inspection succeeds in the correction of about sixty per cent. of the defects found. It must be acknowledged that nurses have been employed up to the present time only in the poorer districts of our cities, where docile foreign mothers and the nearby existence of free medical dispensaries have made the work productive of large results. Exactly what the success of the home

visitor would be among American school children of the better class cannot be determined in the absence of trial, but naturally the results obtained would be greater than those obtained simply by notifications.

Briefly in this connection may be mentioned several aids to the work of medical inspection, which have developed as their usefulness has become apparent in the light of experience: Free dental dispensaries, conducted by a municipality; free, or almost free, lunches in the schools of the poorer sections; the services of specialists in eye, skin and mental diseases; and the institution of a specific corrective exercise by the instructors in physical education for those children found needing them by the medical inspectors. Realization by the authorities in the school system that all children differ in personality and capability has resulted in the institution of sub-classes for the mentally deficient, the poorly nourished, the tuberculosis, the blind, the crippled and the deaf; while the municipal government does and has shown its appreciation of the necessity of fresh air and free outdoor play for school children, by providing playgrounds and recreation centers, the latter often in the school yards.

By the combined effect of these agents, it is hoped that the physical standard of the race may be appreciably raised, and the corresponding increase in average intelligence will result in a better standard of citizenship.

## WHAT AMERICAN CITIES ARE DOING FOR THE HEALTH OF SCHOOL CHILDREN

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### *I. Medical Inspection.*

A little more than sixteen years ago, in 1894, and as a result of some serious epidemics among school children, the city of Boston divided its public schools into fifty districts and appointed fifty school doctors to begin medical inspection in them. The Department of Child Hygiene of the Russell Sage Foundation is now making an investigation to find out what progress has been made in this field in the sixteen years that have elapsed since this beginning.

There are in this country some 1,285 cities having organized systems of graded public schools under superintendents. The investigation covers these cities, and up to the present time full returns have been received from 758 of them. For purposes of tabulating results, the several states of the Union have been divided into five groups, following the order adopted by the United States census. These groups, with the states comprising them, are as follows:

*North Atlantic Division.*—Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania.

*South Atlantic Division.*—Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida.

*South Central Division.*—Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, Arkansas, Oklahoma.

*North Central Division.*—Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas.

*Western Division.*—Montana, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Idaho, Washington, Oregon, California.

Forty-five per cent of the cities reporting have regularly organized systems of medical inspection in their public schools. The

number of cities reporting, the number having systems of medical inspection, and the per cent having such systems in each group are shown in the following table:

CITIES HAVING MEDICAL INSPECTION

Division.	Cities reporting	Cities having medical inspection	Per cent having medical inspection
North Atlantic .....	308	182	59
South Atlantic .....	45	15	38
South Central .....	67	25	37
North Central .....	286	84	29
Western .....	52	31	60
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United States .....	758	337	45

The percentage figures in the final column show that medical inspection has made the best progress in the North Atlantic and Western Divisions, where about sixty per cent of the cities have taken up the new work. It has made substantially equal progress in the two Southern Divisions, where the percentages are thirty-seven and thirty-eight, and the poorest showing is made by the North Central Division, where only twenty-nine per cent of the cities have medical inspection systems.

There are two standard types of administration, that under the board of health and that under the board of education. In the early days of medical inspection, practically all the systems were administered by local boards of health, but in recent years the tide has turned the other way, until at the present time about one-quarter of the cities have systems under their boards of health, and in the remaining three-quarters the board of education is the controlling body. The facts for the different divisions are shown in the following table:

THE ADMINISTRATION OF MEDICAL INSPECTION AMONG 337 CITIES REPORTING

Division	By boards of health	By boards of education
North Atlantic .....	49	133
South Atlantic .....	5	10
South Central .....	8	17
North Central .....	16	68
Western .....	8	23
<hr/>		
United States .....	86	251

The professional employees who are administering these efforts



in behalf of the health of school children include 1,194 school doctors, 371 nurses, and 48 dentists.

In general, medical inspection of schools has two main functions or divisions. The first is inspection for the detection of communicable disease. This relates primarily to the immediate protection of the community, and is in general the first work undertaken. In many states the authorities are content with this purely preventive work, and attempt nothing more elaborate. The second division of the work consists of physical examinations of children, which aim to discover their physical defects and look to securing and maintaining the health and vitality of the individual child. Among the 337 cities reporting, 301 include systems for the detection of contagious diseases, but only a little more than half of them undertake physical examinations. Moreover, the cities attempting physical examinations are mostly in the North Atlantic division, where the work is oldest and is most highly developed. In the table which follows, figures are presented showing the number of cities in each division including inspection for the detection of contagious diseases and physical examinations in their medical inspection systems.

INSPECTION FOR THE DETECTION OF CONTAGIOUS DISEASES AND EXAMINATIONS  
FOR THE DETECTION OF PHYSICAL DEFECTS

Division	Inspection for contagious diseases	Inspection for physical defects
North Atlantic .....	173	111
South Atlantic .....	14	6
South Central .....	23	9
North Central .....	67	26
Western .....	24	15
	<hr/>	<hr/>
United States .....	301	167

There is one branch of medical inspection work which is even more universal than the inspection for the detection of contagious diseases and this is the testing of pupils to discover defects of vision and hearing. This testing has not been included under the general heading of examinations for the detection of contagious diseases for the reason that it is often carried on where there is no organized system of medical inspection and the tests are frequently given by teachers rather than by doctors or oculists. How common these tests are is shown by the fact that although only 337 cities report regular systems of medical inspection, 449 report that vision and

hearing tests are conducted in their schools by teachers, and in addition there are 189 cities where the tests are conducted by doctors. The detailed facts as to tests by doctors and teachers are as follows:

VISION AND HEARING TESTS CONDUCTED BY DOCTORS AND BY TEACHERS

Division	Tests by doctors	Tests by teachers
North Atlantic .....	95	199
South Atlantic .....	9	15
South Central .....	14	25
North Central .....	54	184
Western .....	17	26
United States .....	189	449

The fact has already been mentioned that 1,194 school doctors are employed in the work of medical inspection in the cities reporting. More than half of these are in the North Atlantic states, and more than half of the remainder in the North Central states. Their distribution in the several divisions is as follows:

NUMBER OF SCHOOL DOCTORS EMPLOYED IN MEDICAL INSPECTION

Division	Number of doctors
North Atlantic .....	729
South Atlantic .....	45
South Central .....	31
North Central .....	342
Western .....	47
United States .....	1,194

The employment of school nurses in the work of medical inspection is a comparatively modern development. Less than a quarter of the cities reporting medical inspection employ school nurses, and of these more than half are in the North Atlantic Division. The total number of cities employing nurses is seventy-six, and the total number of nurses employed 371. Of these, thirty-nine cities, employing 242 nurses are in the North Atlantic Division. In the South Atlantic states, only four cities employ school nurses, and the total number employed is only ten. The lowest record is made by the South Central states, where two cities employ one nurse each. In the North Central states twenty-one cities employ ninety-six nurses, and in the Western Division there are ten cities with twenty-one nurses.

The school dentist is a still more recent development of medical inspection than the school nurse. In the entire country only forty-eight cities employ school dentists, of which eighteen are in the North Atlantic Division, three in the South Atlantic, two in the South Central, twenty-one in the North Central, and four in the Western Division.

The salaries paid to school doctors and school nurses vary from nothing to nearly \$4,000. In many localities the local medical association conducts medical inspection for a year or two without cost to the city in order to demonstrate its value. This results in the record showing that in a considerable number of the cities the doctors receive no pay at all for their services. It may also be a factor in bringing about the extremely low salaries that are received by the school doctors in many cities after they are given regular payment.

ANNUAL SALARIES OF DOCTORS AND NURSES IN ALL CITIES REPORTING

	Number of cities where doctors receive salary indicated	Number of cities where nurses receive salary indicated
No salary .....	30	2
\$1 -100 .....	42	4
\$101-200 .....	34	..
\$201-300 .....	32	2
\$301-400 .....	21	..
\$401-500 .....	19	..
\$501-600 .....	14	15
\$601-700 .....	1	13
\$701-800 .....	9	19
\$801-900 .....	4	11
\$901-1,000 .....	11	..
\$1,001-1,500 .....	14	2
\$1,501-2,500 .....	3	..
\$3,500-4,000 .....	2	..
Fees according to service.....	16	1

The same factors result in similar conditions among school nurses. The preceding table shows the number of cities in which the salaries of doctors and nurses fall within the salary limits named in each group. That is to say the first line shows that there are thirty cities in which the doctors donate their services and two in which the school nurses do the same thing. The second line indicates that there are forty-two cities in which the salaries paid to the

doctors are between \$1 and \$100 per annum and four cities where the nurses are in receipt of similar salaries.

The table shows that there are more cities paying their school physicians at a rate of between \$1 and \$100 per year than there are paying salaries of any other size. The average salary on the other hand is somewhat higher than this. If computed on the basis of the table and without taking into account the number of doctors employed in each individual city the average salary would fall within the group receiving from \$201 to \$300 per annum. In a similar way the second column of the table shows that there are more cities paying their school nurses from \$701 to \$800 per annum than there are paying any other salary. But the average salary would fall within the group from \$601 to \$700 per year.

It has been stated that the first system of medical inspection was inaugurated by Boston in the year 1894, and historically this statement seems to be correct. Nevertheless one city claims to have been doing enough work for the health of school children to warrant it in reporting that it had a system of medical inspection in the year 1890. Ten years later, in 1900, eight cities had such systems, and in the five following years the increase had brought the total number up to forty-four. The real development of medical inspection has come in the past five years, during which the number has increased from less than fifty to more than 300. Out of the 337 cities reporting systems of medical inspection, only 312 state the year in which work was first begun. From the records of these cities a table has been compiled showing the total number of cities having medical inspection systems in each year since the first city began. These facts follow:

NUMBER OF CITIES HAVING SYSTEMS OF MEDICAL INSPECTION IN EACH YEAR  
FROM 1890 TO 1910

Year	Number of cities	Year	Number of cities
1890 .....	1	1904 .....	28
1894 .....	3	1905 .....	44
1897 .....	4	1906 .....	63
1898 .....	7	1907 .....	90
1900 .....	8	1908 .....	135
1901 .....	14	1909 .....	211
1902 .....	20	1910 .....	312
1903 .....	23		

The detailed reports for the separate cities and the tabulations bringing the facts together for the individual states contain a vast amount of material of value and interest, but of such bulk that it would be impossible to present it here. The total number of items is about 25,000. It is our intention to compile it in full and present it in a final report of this investigation. As showing the extremes among the reports of the different states, it is interesting to note that the best record of all is made by the State of New Jersey, where thirty-four cities reported, and every one of them has an organized system of medical inspection. Massachusetts is a close second; among eighty-six cities all but two have medical inspection systems and in Colorado among six cities reporting, there is only one not having medical inspection. The states at the other extreme of the scale which report no cities with medical inspection are Vermont, Florida, Idaho and Montana.

## *II. Hygiene of the School Room*

The gathering of the salient facts regarding the present status of medical inspection was not the sole object of the investigation now under way. A second and related purpose was to discover what the different cities are doing in the administration of the health interests of their school children in such matters as recesses, the cleanliness of floors and windows, precautions as to drinking cups and instruction in such matters as the prevention of tuberculosis and the giving of first aid in emergencies.

It is generally taken as a matter of course that the outdoor recess is part of the regular program in all elementary grades, and in both sessions of the day school. Moreover such is the case in large sections of the country, but the data gathered show that it is far from being true in the North Atlantic States, and that in the other divisions there are cities where the children are not given outdoor recesses. The figures showing the number of cities having outdoor recesses in their elementary classes, and the per cent of such cities, are given in the table on page 257.

Another subject for investigation was the extent to which individual drinking cups and sanitary fountains are in use in the different cities. As the information was gathered, the city recorded as having sanitary drinking fountains or individual cups has at least made a beginning in these directions. The figures given here



do not indicate what proportion of the schools of each city have these appliances. They merely indicate that at least a beginning has been made. The figures show that in twenty-five per cent of the cities individual drinking cups are in use, and in seventy-five per cent the schools have sanitary drinking fountains. These figures do not mean that all cities are supplied with either individual drinking cups or sanitary fountains, for the data include many duplicates. A considerable number of cities have schools equipped with both individual cups and sanitary fountains, and, on the other hand, some cities have not introduced either the one or the other.

NUMBER AND PER CENT OF CITIES HAVING OUTDOOR RECESSES IN ALL  
ELEMENTARY GRADES

Division	Cities reporting	Having out- door recess	Per cent hav- ing recess
North Atlantic .....	308	259	84
South Atlantic .....	45	44	98
South Central .....	67	67	100
North Central .....	286	264	92
Western .....	52	49	94
United States .....	758	683	90

The group of facts pertaining to the hygiene of the school room was gathered from the entire 758 cities from which returns have been received to date. They show that in considerably over half of the cities moist cloths are used for dusting; in nearly all of them dust-absorbing compounds are used in sweeping; and that in nearly a tenth of them the schools are equipped with vacuum cleaners.

But a slight knowledge of housekeeping is necessary to make one realize that the appliances used for cleaning are not of such importance as the frequency with which they are employed. Having this in mind we have gathered the facts as to the frequency with which the school room floors are washed and swept, and the windows washed in the public schools of these 758 cities. The facts, as reported, are shown in the table on page 258.

The figures are illuminating as they are unique. Probably these details of municipal housekeeping have not before been gathered. They seem to indicate that the most common practice sanctions the washing of class room floors either once a month, or once in

three months, although it is by no means rare to find cities in which they are washed once in five months or never washed at all.

In the great majority of the cities school room floors are swept once a day, but nevertheless there remains a balance of nearly two hundred cities in which they are swept less frequently. Six cities report that they are swept only once a week; two cities once a month; two cities that they are swept only once in five months.

More cities seem to wash their class room windows once in three months than on any other regular schedule. On the other hand one city reports washing them once a day, and five cities that they never wash them at all.

NUMBER OF CITIES IN WHICH THE SCHOOL ROOM FLOORS ARE WASHED AND  
SWEEPED AND THE SCHOOL ROOM WINDOWS WASHED  
WITH FREQUENCIES INDICATED

Frequency	Cities where floors are washed with frequency indicated	Cities where floors are swept with frequency indicated	Cities where win- dows are washed with frequency indicated
Daily .....	1	574	1
Once in 2 days.....	1	49	1
Once in 3 days.....	3	86	..
Weekly .....	36	6	22
Once in 2 weeks.....	27	2	8
Once in 3 weeks.....	8	..	5
Monthly .....	135	2	117
Once in 2 months.....	50	1	84
Once in 3 months.....	140	..	139
Once in 5 months.....	115	2	111
Once a year .....	57	..	31
As needed .....	68	10	139
Never .....	44	..	5
Not reporting .....	73	26	95
Total .....	758	758	758

Adjustable desks, which can be fitted to the size of the pupils, are more common proportionately in the North Atlantic states than elsewhere. In the country, as a whole, they are in use in practically half of the cities. They are more common in the North than in the South. The figures showing the number of cities where they are in use, and the per cent which these are of the entire number reporting, are as follows:

NUMBER OF CITIES USING ADJUSTABLE DESKS IN THEIR SCHOOLS

Division	Number having adjustable desks	Per cent having adjustable desks
North Atlantic .....	213	69
South Atlantic .....	12	27
South Central .....	18	27
North Central .....	92	32
Western .....	23	44
	<hr/>	<hr/>
United States .....	358	47

Just as highly perfected methods for cleaning are not efficacious unless they are frequently used, so adjustable desks are not beneficial unless they are frequently adjusted to the size of the children using them. These 358 cities having adjustable desks report that they are adjusted as follows:

CITIES ADJUSTING DESKS AT EACH INTERVAL NAMED

Interval	Number of cities
Daily .....	1
Once a month.....	3
Once in 3 months.....	14
Once in 5 months.....	12
Once a year.....	7
As needed .....	283
Never .....	1
Not reporting .....	37
	<hr/>
Total .....	358

Besides the indirect benefit and training which the children receive from having their class rooms hygienically administered there remains the question of the direct instruction they receive in theoretical and applied hygiene. To discover something of what is being done in this field facts have been gathered showing the number of cities having regular courses for teaching the children about the effects of the use of alcohol and tobacco, for training them in the avoidance and cure of tuberculosis, and in giving them instruction about first aid to the injured.

The figures show that ninety-five per cent of the cities teach their children the effects of alcohol and tobacco; sixty-one per cent have special courses on the prevention and cure of tubercu-

losis; and fifty-seven per cent give lessons in first aid. The figures showing the number of cities doing each kind of work in each of the five divisions, follow:

CITIES GIVING INSTRUCTION IN ALCOHOL AND TOBACCO, TUBERCULOSIS,  
AND FIRST AID

Division	Alcohol and tobacco	Tuberculosis	First aid
North Atlantic .....	293	203	165
South Atlantic .....	39	25	18
South Central .....	60	40	37
North Central .....	276	169	178
Western .....	49	25	32
	<hr/>	<hr/>	<hr/>
United States .....	717	462	430

The facts that have been so rapidly reviewed show that communities over the entire country are seeing the whole matter of the health of school children in a new light. Gradually they are beginning to ask, not whether they can afford to take steps to safeguard in the schools the welfare of their children but, whether they can afford not to take such steps. The movement, as a whole, constitutes both a sign and a result of the gradual awakening which has developed into a wave of interest in matters pertaining to the health of school children that is now sweeping over the civilized world.

We are beginning to realize that the public schools are a public trust. When the parents deliver a child to their care they have a right to expect that the child, under the supervision of the school authorities, will be safe from harm and will at least be handed back to them in as good condition as he was at first. Individual efficiency rests not alone on education or intelligence, but is equally dependent on physical health and vigor. Hence, if the state may make mandatory training in intelligence, it may also demand training to secure physical soundness and capacity. Much time will elapse before there will be brought to bear in all schools measures now so successfully pursued in some for preserving and developing the physical soundness of rising generations. Nevertheless, the movement is so intimately related to the future welfare of our country and is being pushed forward with such great energy and earnestness that it is destined to be successful and permanent.

## THE ELIMINATION OF FEEBLE-MINDEDNESS

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Feeble-mindedness may be defined as a state of mental defect from birth or from an early age due to incomplete or abnormal development, in consequence of which the person afflicted is incapable of performing his duties as a member of society in the position of life to which he is born. There are according to the most careful and reasonable estimates in the United States about three hundred thousand persons who would come under this definition. These are conveniently divided into three groups: (*a*) lowest, or idiots, (*b*) middle group, or imbeciles, and (*c*) highest group, formerly called the feeble-minded in a specific sense, but to whom we are now giving the name of moron.

The following definitions of these groups were given by the Royal College of Physicians of London, and were adopted by the Royal Commission on the Feeble-Minded as a basis of classification. The idiot is defined as "a person so deeply defective in mind from birth or from an early age that he is unable to guard himself against common physical dangers." The imbecile is defined as "one who by reason of mental defect existing from birth or from an early age is incapable of earning his own living, but is capable of guarding himself against common physical dangers." While the moron is defined as "one who is capable of earning his living under favorable circumstances, but is incapable from mental defect existing from birth or from an early age, (*a*) of competing on equal terms with his normal fellows, or (*b*) of managing himself and his affairs with ordinary prudence."

### *Why We Should Eliminate Feeble-Mindedness*

The part of feeble-mindedness that comes under the term "idiocy" comprises a group of helpless children who are no comfort to themselves and no comfort to their parents or caretakers. Of all pitiable humanity probably the idiot comes in for the largest share of sympathy from those who see him. He is a source of expense



and trouble. No matter how freely the trouble may be met by those nearest of kin, it is nevertheless true, that a child so afflicted is a constant source of unpleasantness and unhappiness to all those who have to do with him. Surely every one would say, if it is possible to eliminate this kind of feeble-mindedness it must be done. Nevertheless, as we shall see later, this is of all the groups the least objectionable and the least dangerous.

The group called "imbeciles" comprises those persons who are usually recognized as silly, foolish, or stupid. They can, if wisely trained be made to do some work and be a little helpful. But they are always a menace to society because it can never be determined beforehand when any one of them may yield to any of his natural impulses and destroy life or property. Society must set a large army of teachers, trainers, or attendants to watch over and care for these, or be in continual danger of injury or even destruction at the hand of this irresponsible group. The elimination of this grade of feeble-mindedness would result in an enormous improvement in happiness and possibilities of achievement in every community.

The highest group, the "moron," comprises those persons who to the superficial view are often considered normal but somewhat backward or dull. As the definition tells us, there are two characteristics of these people. The first is that they are unable to compete on equal terms with their fellows; and, second, they are unable to manage their affairs with ordinary prudence. The result of the second characteristic is that again it requires a large army of people to take care of these morons, and to see that their affairs are managed with prudence. In the past it has been difficult to provide for this class in this way because the ordinary person, not recognizing this as a form of feeble-mindedness is unwilling to interfere in the affairs of such an individual and manage them for him, as ought to be done. In consequence of these two characteristics of the moron, he becomes an enormous drag upon society, and the elimination of this grade of feeble-mindedness would be the greatest boon of all. Being unable to compete on equal terms with his normal fellows, he is always either an object of charity or a dishonest person. Not being able to earn a living from his own honest efforts, he either becomes a beggar and pauper, living more or less at public expense, unless indeed, he has relatives who are willing to supplement what little he may earn and so help out his existence, or else he turns to dis-

honest practices in order to get that which he needs for a living. And this is the most innocent form in which his defect shows itself. In other cases his natural instincts, however vile they may be, express themselves to the full because he has no power of control over them, and they easily turn him to crime. He becomes a criminal of the lowest sort, and in all these ways he becomes a serious menace to society, as he logically must.

But this is not only a matter of logic; facts may be produced to show that this is what actually happens. It has been found by some studies not yet published by the Galton Laboratory in England that paupers are found in the almshouses who are the children of paupers that were there before them, and they in turn were preceded by their pauper parents. In all probability we have here only another case of mental deficiency. Every one who has had to do with criminals in our jails and prisons recognizes that a large per cent of them are mentally defective, while those who have made any observations at all upon the prostitutes recognize that here also a considerable percentage are feeble-minded, and have simply fallen into this form of life because they could not make a living in any honest way, and because they easily became the victims of others who have had designs upon them.

These are the people who cannot be taught decent living, and through their ignorance of things, which they have not the capacity to learn, they spread disease, through their person and their untidy surroundings. They are thus a menace to public health as well as to morals.

Thus it is positively proved that the elimination of this type of feeble-mindedness would save us a large percentage of our pauperism, of our crime, and of prostitution, to say nothing of the large army of the ne'er-do-wells that are known all about us; and, again, of those persons who are known to be defective, but are cared for in their own families and make no demands upon the public.

The relative number of the different types is very uncertain because we have had until recently no accurate means of determining the grade or degree of defect, but it is perhaps not far wrong if we assume that we have twenty-five per cent. in the idiot grade, fifty per cent. in the imbecile grade, and twenty-five per cent. in the moron. If any correction is to be made to this estimate, it is probable that there are rather less idiots and rather more morons.

A study recently made by the Vineland Laboratory of the mental development of the children in an entire school system of 2,000 children shows three per cent. of the first five grades to be feeble-minded; fifteen per cent. were two and three years backward; seventy-eight per cent. were normal, and four per cent. were super-normal.

*Can We Eliminate Feeble-Mindedness?*

We may consider this question from two standpoints: first, can we eliminate feeble-mindedness without eliminating the feeble-minded; or in other words, can a feeble-minded person be cured? Since Seguin, very few persons who have studied the problem have been willing to give anything but a negative answer to this question. Indeed, it is usually stated very emphatically that a person once feeble-minded is feeble-minded always. But if we look at the question in the broadest way we have to confess that our sole reason for saying that these children are incurable is that they never have been cured. It is quite a different thing from being able to say with authority that they never can be cured.

In the case of the lowest grade, it is true, we have no reason to hope for anything else. While very little anatomical study has been made, what has been made has given rise to the conviction that there are deficiencies in brain tissue, such that normal mentality could not be produced under any circumstances. But the same thing cannot be said of the higher grades. Indeed, our ignorance of anatomical conditions is so great that no one can say positively that the feeble-mindedness in some proportion of the moron type is not due to conditions which might be easily changed if we understood them.

Recent findings in the Vineland Laboratory seem to indicate that in some cases these children may be perfectly normal to quite a late age of childhood, possibly eight or ten years. If this proves to be the case, then comes the very insistent question, Why may we not learn how to so treat these children in early years as to prevent the onset of this condition later?

By the thyroid treatment it has been possible to restore the cretin from the imbecile type to perfect normal conditions, both physically and mentally. If such a result is possible in this particular type may not something else be discovered which will work similar results in other types? The very thought of the possibility of this

suggests the enormous need of greater research along these lines. Society might spend millions in the study of this problem, and the efforts to eliminate feeble-mindedness in this manner. Even if the results were negative and it were discovered that it is impossible they would be well worth having. But until we have studied the question and found out the actual condition, we are groping blindly in the dark.

Should it eventually be proved that our guesses are true and that feeble-mindedness is the result of an inherited defect, that can not be changed, then our problem shifts to the other side, and we must ask ourselves, can we eliminate feeble-mindedness by eliminating the feeble-minded. This, of course, must mean the prevention of the production of feeble-minded persons and not the destruction of such persons after they are born. For while the thought does rise in the mind of most any visitor who looks at a room full of idiots, "Oh, that these persons might be quietly put to sleep and put out of this wretched condition," yet when we attempt to face such a thing practically we find that not only our hearts, but our heads, revolt from such a thought. Humanity, because it is humanity, can never resort to such a procedure, and a child once born into the world must live its life until it passes out by natural means and against all the reasonable efforts that we can devise to keep it alive.

Turning our attention then to the prevention of the birth of feeble-minded persons, we have several lines to consider. In the first place, we have to review the various known causes of mental defect. We have, first, two great groups, the feeble-mindedness that is hereditary, and the feeble-mindedness that is the result of environment. Under the latter head we have possibly the following causes: malnutrition, epileptic and infantile convulsions, toxic, primogeniture, traumatic, premature birth, abnormalities of labor, injuries to the fetus, abnormal conditions of the mother during pregnancy—mental and physical, the age of the parents, consanguinity, syphilis, tuberculosis, alcoholism, and disease of the nervous system. It will be seen that we have taken environment in the broadest sense to include everything that may cause mental defect which is not true heredity. In the other group we have those cases where the child is feeble-minded for no other reason than that the parent or grandparent was feeble-minded; in other words, the case of true inheritance.

I have also mentioned in the environment list several things that studies show are not causes. They are included here because they are popularly thought to be causes. Consanguinity is perhaps the most striking illustration of this. Age of parents may be another; also primogeniture, and premature birth, while other things mentioned in this list are still either in doubt or are known to have a very slight influence. But whether the influence be slight or much it is evident that we can if we know enough change the environment; and the conditions which often produce feeble-mindedness may be eliminated, thereby eliminating the mental defect. But all these causes combined are small compared to the one cause—heredity. The vast majority of feeble-minded persons are so because parent or grandparent was feeble-minded and there is true inheritance.

The following two charts, illustrative of a large number, show what we mean: Chart I shows the feeble-minded grandchildren of a feeble-minded grandmother. Chart II shows the feeble-minded children of a feeble-minded father.

Often we have charts upon which half the persons represented are feeble-minded. Can we eradicate feeble-mindedness in this hereditary form?

If a farmer has a breed of cattle that he no longer desires he has simply to cease breeding from this stock and the race dies out. We know that many species in nature have died out. And so here, if we have in the feeble-minded race an undesirable variant from the normal, we can, if we will, interfere and see to it that this race does not perpetuate itself. So the answer to the question, can we eliminate the feeble-minded, is answerable in the affirmative. It is true that a certain amount of feeble-mindedness is accidental, and accidents will always occur, so that we may not look forward to a time when there will not be a certain number of feeble-minded persons, but they will be in such a small proportion as to be practically a negligible quantity.

#### *How Shall We Eliminate the Feeble-Minded?*

As already implied, the only way to eliminate the group of feeble-minded due to environmental conditions is to change the environment. If feeble-mindedness is sometimes due to abnormal conditions of the mother during pregnancy, we must study the problem and



understand the situation at that time, so that abnormal conditions may not exist. If epileptic convulsions produce feeble-mindedness we must learn to control epilepsy, and so on through the list. All this again implies that we need an enormous amount of study to manage this problem, for as yet we are absolutely ignorant on nearly all of these points, but the possibilities of eliminating this group of

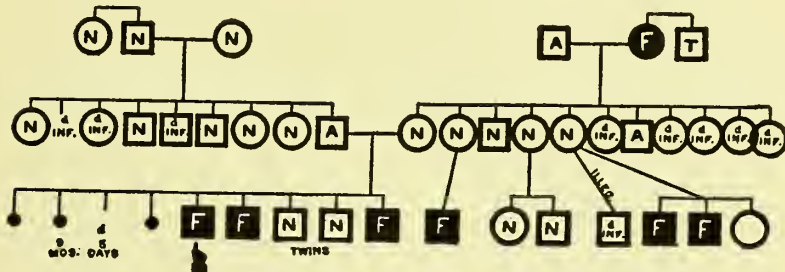


CHART I.

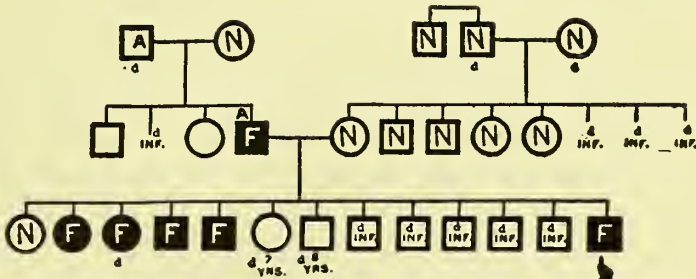


CHART II.

*Key to Charts.*

Square indicates male. Circle indicates female. A, alcoholic (habitual drunkard). F, feeble-minded; N, normal; T, tuberculous; small black circle indicates miscarriage; b=born; d=died; inf.=infancy; illeg.=illegitimate; hand shows which child is in the institution for the feeble-minded.

the feeble-minded is not to be denied, and the method is plain when once we have learned the facts.

All this sort of feeble-mindedness ought to be eliminated, and some day will be, but on the other hand this is actually only a small percentage of feeble-mindedness, as shown above. The feeble-

mindfulness of the greatest group is hereditary, and the cause of such feeble-mindedness is the feeble-minded parent or grandparent, and our problem here takes another turn.

As we face the question, "can we prevent children being born of persons who are feeble minded?" there are two possible methods. The first would be to keep the sexes apart; and the second to render them incapable of reproduction.

The first of these is discussed usually under the head of permanent custodial care. This means that society must set to work to discover all of these feeble-minded persons, and as rapidly as possible segregate them in colonies where the sexes are kept absolutely apart so that every feeble-minded male and every feeble-minded female is compelled to live his or her life in conditions of absolute sexual seclusion. If this were done, we would have in a single generation all of the hereditary cases taken care of except those that arise sporadically from the free variation in the stock, and this would be comparatively small.

Every one admits that permanent custodial care is the ideal solution of the problem, both from the standpoint of effectiveness and from the standpoint of the humanity of the case. The great objection or difficulty that arises in connection with this, and is usually considered insurmountable, includes the item of expense involved, and, second, the difficulty to getting all of these people into a colony and under the control of those who have sufficient intelligence.

The first of these arguments is fallacious. The cost of such a procedure would be large, but it would not be as large as the present cost to society for the care of these same persons, to say nothing of their progeny in future generations. Colonies for these feeble-minded would to a large extent take the place of prisons and almshouses, with the advantage that the persons in these colonies could be trained to more or less useful work under the supervision of experts, whereas the inmates of our present institutions for the poor and the criminals are practically of no use to society.

One must also refer to the sentimental reason that is often met with that it is cruel, or at least unpleasant, to think of placing these children in institutions. To this it must be replied there are institutions and institutions. Any one who cares to investigate the matter may discover for himself that it is possible to have institutions

for the feeble-minded that are the happiest places in the world. It is possible to help these people to live a life of complete happiness in proportion to their mental attainments. And one cannot visit our best managed institutions without going away with the firm conviction that it is possible to colonize all of our feeble-minded persons under conditions in which they would be perfectly happy. Thus any objections that seem to occur from the feeling that it is treating them badly are at once eradicated. Such ideal institutions would also very largely eliminate the difficulty of inducing parents to give their consent to the transfer of their defective child to an institution. However, the success of such a plan is not dependent upon the consent of the parents. Even though society finds itself unwilling forcibly to deprive the parents of their feeble-minded child, there is still a possibility. If parents are unwilling for their child to be transferred to such a colony, the child may be trained in the public school by methods that are suited to his mental condition. He may be guarded by his teachers and the probation officers or some person similar who keeps his eye upon such a child while he is at home. After he has left school, if he leaves it, and upon the slightest indication that he is going wrong, is thinking of marrying, or is in danger of becoming a parent out of matrimony, the State may then interfere, and take the child to the colony home. Such a procedure may be managed in such a way as not to offend our most sensitive feelings for justice to the defective.

This is not the place to go further into details, and show how such a plan may be worked out with entire success and at a cost that is well within the means of any Commonwealth, and that it would be cheaper in money, more economical in social life, and of immense value morally. Time does not permit me to even extend the argument, and show that this colony idea is the ideal one not only from this standpoint of the reproduction of the species, but also from that of the welfare of the person and of society.

As was said earlier in this paper, these persons are all and always a menace to society. Aside from the tremendous menace of procreating their kind, it can never be predicted when one of them may commit crime or do some action innocent to him because of his irresponsibility, but which results in loss of property or life. All of these things make it of the utmost desirability that these children be segregated from normal society, and be placed in an

environment that not only makes them happy, but makes them safe from their own defect, and makes other persons safe.

There is left for consideration treatment for rendering all feeble-minded persons incapable of perpetuating the species—what is spoken of as sterilization, asexualization, or unsexing. Some method for this must undoubtedly be considered and practiced to a greater or less extent, but it must be remembered that it is a makeshift. Such a procedure is very far from being an ideal solution of the difficulty. For reasons already mentioned these persons should be segregated from normal people, and if they are to be segregated and colonized in a place where they can be cared for, and trained and made happy, any other method is unnecessary, the problem is solved without it. However, it is possible that conditions have become so bad that we must seize upon everything that offers hope of relief. We have taken such good care of these people for so many years, have allowed our humanity to get so far ahead of our judgment and reason that we have turned loose in the community a large body of strong men and women, well developed physically, but who have this hereditary taint of feeble-mindedness. As a result, feeble-minded children are being born at such a rate that the mere mechanical problem of constructing buildings fast enough to take care of them is serious, so serious that we must resort to some method as a make-shift to help us out of the difficulty, and get us on our feet and place us where we can control the situation. There is no question that there should be a carefully worded sterilization law upon the statute book of every State, and that the practice should be carried on judiciously and carefully, but persistently all over our country, in order, as we have already said, that we may thus help to get control of the situation.

Two States have already passed such laws. Several other States have introduced such bills, but they have usually failed by a small margin to become law.

When we come to practicing some method of sterilization we are again brought face to face with our ignorance of methods and results. We have first, of course, the old and time-honored method of castrating the males and ovariectomy for the females. This is an efficient method, and as far as males are concerned, entirely safe. The only objection to it seems to be a sentimental one. Just what are the consequences, the metabolic changes in the individual as a re-

sult of this operation, is not known with any high degree of scientific accuracy. Nevertheless, there are no indications that there are any serious consequences. The practice would accomplish great good in this line.

It must be admitted, however, that the operation on the female is a somewhat more serious one, and can hardly be practiced on any large scale without some danger of fatalities in a small percentage of the cases. Perhaps this is not greater than occurs in such operations as appendicitis to which normal people submit daily.

Recently a new method has come into the field which has a few very ardent advocates, particularly as far as the male is concerned. The operation is known as vasectomy. It is very simple, and may be performed in a few minutes in the physician's office, and with no other effect on the individual or his activities than the absolute prevention of procreation. It is even claimed that the result of this is a decided tonic effect upon the individual.

The analogous operation upon the female, that of tying the fallopian tubes, is more difficult than the operation on the males, and as yet no method of performing it has been discovered that avoids abdominal section with its concurrent dangers.

Biologists hold out some slight hope that methods of sterilization by X-rays may yet be discovered and become practical. However, that is still so far in the future that it is not worth the space to discuss it here.

It is noteworthy in all these methods that any operation is much more difficult on the female than on the male. This is a crucial point, because even if we are content with a partial result, the sterilization of the feeble-minded males does not begin to halve the difficulty. Experience shows that there are many more normal men who will marry or live out of wedlock with feeble-minded women than vice versa, and consequently, unless something can be done to sterilize the female, our problem of eliminating feeble-mindedness by this method is not halved.

Here again we are faced by so much ignorance on this matter that it is difficult to speak with any assurance. There is an imperative need for careful study and investigation of all of these problems. Many of them would yield to a small outlay of time and money, and the answers would be clear and assuring; others of them are much more difficult, will require longer and more careful investigation.



But in these days of scientific advancement it is unwise for us to assume that any of these are insolvable. The only wise and rational method is for us to proceed as rapidly as possible to study these conditions, and get at fundamental facts upon which we can base our practices.

I have tried to show in this paper as briefly and concisely as possible the enormous prevalence of feeble-mindedness; (1) what feeble-mindedness is, (2) why it ought to be eliminated, (3) that it can be eliminated, and (4) how it can be eliminated. I have also not avoided the necessity of showing that along many of these lines we still need much more data. There is absolute necessity for our studying the problem, and finding out the facts upon which our solution must depend and upon which we must act.

In conclusion, let me say that the work has been begun, and it is eminently fitting and encouraging that the American Academy of Political and Social Science has and should take up this problem, and carry it through. Society is ready for it, we are beginning to recognize the truth of the various things presented in this paper, and I believe that it only needs some person or persons, or organization to take up the matter, act as leader and guide and director in this new social movement in order to carry out a reform here which has untold value for the benefit of our present society and the humanity of the future.

## PREVENTION OF INFANTILE BLINDNESS

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BY CHARLES F. F. CAMPBELL,

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One hundred thousand <sup>1</sup> blind distributed over our great country approximately one to one thousand—does not impress the general observer as an appalling condition, but if all these could pass in review, no doubt the gravity of the situation would be more striking. If we could assemble even the percentage counted by reliable investigators as blind from preventable causes (accident, disease, etc.)—some forty thousand in number—they would make a formidable assemblage, and present a never-to-be-forgotten example of the results of ignorance and neglect.

Confining our inquiries to ophthalmia neonatorum, "the purulent sore eyes of new-born babies," we find that to this is attributable from one-tenth to one-eighth of all blindness from all causes. Ten thousand persons are blind from this one preventable disease alone.

Private charity is erecting nurseries for the care of blind infants, 50 per cent. of whom are sightless because of the ravages of this disease. One-fourth to one-third of all the children in our great public and private institutions maintained for the special education of blind youth are there as a result of this same disease. The public is further taxed to maintain the burden of the support of these blind children when they reach adult life, and in some instances pensions are granted.

The blind themselves are making a most courageous struggle for self-support in the face of an inexpressibly heavy handicap. The deprivations of the loss of sight to the blind cannot be estimated. "What blindness means to an intelligent, capable man or woman," to quote the words of a blind man who has, in the face of heavy odds,

<sup>1</sup> It is pretty generally conceded that there are 100,000 blind in the United States. The absence of any authoritative definition of blindness accounts for the lack of agreement between the Federal and State Censuses and for the discrepancy in figures quoted by various writers. Those interested in this phase of the subject should study the definition and classification of blindness under the three captions: (1) Total or absolute blindness; (2) relative blindness; (3) practical blindness as worked out by Dr. Lewis Striker, of Cincinnati.

taken his place in the world with signal success, "is something which only the Lord and the devil and those who endure it know anything about; in their blackest nightmares, those with sight cannot even faintly imagine it, and unemployed blindness is as much worse, as despair is worse than hope." The cost to the State of maintaining a blind person throughout the duration of his life is, owing to incomplete data, difficult to compute, but approximates roughly \$10,000. Of the ten thousand blind from ophthalmia neonatorum, all are probably dependent through childhood and youth; some pass directly from the school to a home, and are thus supported by private or public funds through their entire lives; others become self-supporting, and some partially so, through adult life. Again, others, after leaving the school, maintain themselves during the so-called working period, but have not been able to provide for old age, and again fall back upon state or other charitable aid. The expense is so distributed, and the appeal to the sympathies of legislators and philanthropists to "pity the poor blind" so compelling, that the aggregate amount expended is rarely considered.

For the education and maintenance of the victims of ophthalmia neonatorum attending the state schools for the blind in Massachusetts, New York, Ohio and Pennsylvania, the annual expenditure of public funds in excess of the cost of educating the same number of seeing children in the public schools is approximately \$110,000. If all the figures were available, the total annual excess cost in these four States for the education and maintenance of children, blind from this one preventable cause, would not fall far short of \$150,000. Less than one-tenth of this amount would amply provide for the free distribution of a prophylactic against ophthalmia neonatorum, basing the estimate on present expenditures in States where such distribution is in force.<sup>2</sup> But it must be remembered that if we had the figures showing the expense for the maintenance of the adults who were blinded in babyhood from ophthalmia neonatorum, \$150,000 would not begin to cover the annual cost of the needlessly blind in these four States alone. A very large majority of the ten thousand blinded from this cause are now beyond school age.

The ignorant idea of disease as representing the chastening dispensation of Providence, and as such to be meekly borne, is happily being dispelled; although we are brought face to face with

<sup>2</sup> In the states in which such provision exists New York estimates the cost at \$5000, Massachusetts at \$2500, Rhode Island \$300 to \$400, Ohio \$1200.

such evidence to the contrary, as in the case of three children by the same parents blinded from ophthalmia neonatorum, whose mother accepted the repeated afflictions as "the will of God," still, the inalienable right of every child to a fair start in the race of life is slowly gaining recognition.

It is necessary to face the facts; to make known the true cause of this disease, ophthalmia neonatorum; and arouse parents and those caring for infants to a realization of its perils, if we are to secure prompt and expert treatment for those afflicted—if we would give even a fighting chance to the one to two per cent. of live births afflicted with ophthalmia neonatorum.

It is not the purpose of this paper, however, to attempt a scientific treatise on ophthalmia neonatorum, or on the technique of its treatment or prevention, but, rather, to call attention to the prevalence of the disease, the needlessness of its cruel blight on innocent lives, and the measures that are being taken to check its pitiful havoc in the United States.<sup>3</sup>

A brief paper which admirably summarizes the historical and medical aspects of this subject, and from which we have quoted freely, was read by George F. Keiper, A. M., M. D., before the Indiana State Medical Association, September 28, 1910. As Doctor Keiper remarks, "ophthalmia neonatorum is as old as medicine," although it was a long time before the true cause of the disease was discovered, but, now that certain facts are established beyond dispute, "the problem of prevention," as Helen Keller says, "should be dealt with frankly. The facts are not agreeable reading, often they are revolting."

While other bacteria may be the cause of the disease, infantile ophthalmia results, in most cases, from gonorrhœal<sup>4</sup> infection, usually innocently acquired, the destructive germs in the leucorrhœal discharge of the mother getting in the eyes of the child, with few exceptions, during or shortly after birth.

<sup>3</sup> A bibliography of over 300 articles and books upon this subject is in course of preparation by the Pittsburg Carnegie Library, and will be invaluable for students of this subject. For a study of the movement in the United States the reader is especially referred to the writings of Dr. Lucien Howe, the pioneer in securing legislation for the prevention of ophthalmia neonatorum in this country, and to those of Dr. F. Park Lewis, who is the inspiration of the present agitation.

<sup>4</sup> The most conservative authorities state that the gonococcus is responsible for two-thirds of all cases of ophthalmia neonatorum. Other investigators place the percentage much higher.

It is an infectious, contagious disease, accompanied with the secretion of pus from between the eyelids, manifesting itself usually from a few hours to a few days after the birth of the child, and, when left untreated, results in great damage to, if not destruction of, the child's eyesight.

Ten thousand blind because of this disease!<sup>5</sup> But the movement to eradicate this evil is a campaign of hope—for the cases that do not respond to proper treatment are so rare as to be left out of the reckoning, and 99½ times out of 100 the infection is preventable.

The two factors in the treatment of this disease—cleanliness and the destruction of the fatal germs and resultant inflammation—require the most skillful, persistent nursing and expert medical attention.

The correct use of the right prophylactic, one of the silver salts, can only be intrusted to an expert. But, better than treatment, with its uncertainties, is prevention. The writings of Benjamin Gibson, of Edinburgh, produced in 1807, sound as if written to-day, for he says: "(1) Remove the disease, if possible, in the mother during pregnancy; (2) if that cannot be accomplished, remove artificially as much of the discharge as possible from the vagina at the time of delivery; (3) at all events, pay particular attention to the eyes of the child by washing them immediately after delivery with a liquid calculated to remove the offending matter or to prevent its noxious action." This was written long before it was known that the gonococcus or any other germ was the cause of the disease. But, unfortunately, the books on medicine generally made little or no mention of ophthalmia neonatorum nor its dangers. In 1874, or thereabouts, various forms of disinfectants are known to have been used as preventives. In 1879 Neisser discovered gonococcus in the secretions of the eyes of children affected with ophthalmia, but it was left to Prof. Carl Credé, director of the Maternity Hospital, University of Leipsic, during the years 1880-1882, to systematize a means of preventing the dreaded disease, and thus to confer upon succeeding generations an everlasting benefit.

<sup>5</sup> For "histories" of cases pathetic in the extreme, tragic in number, see "Needlessly Blind for Life," Bulletin No. 1, Massachusetts Commission for the Blind, and Reports of Social Service Work at Massachusetts Charitable Eye and Ear Infirmary, Boston, Mass.



The method, as described in his own words, follows: "The eyelids were gently separated by an assistant, and by means of a glass rod a single drop of the solution was placed in each eye. For twenty-four hours after the application the eyes were cooled by means of a linen fold, soaked in salicylic acid (2:100) laid over them." The percentage of babies contracting the disease rapidly fell when the Credé formula was adopted.<sup>6</sup>

The method now used consists in simply applying a 1-per-cent. solution of the nitrate of silver, one application dropped in each eye, and nothing else afterward. Doctor Howe says: "As this solution of silver removes the superficial layer of epithelial cells, it probably destroys, at the same time, any germs which may be in them. Whatever theory there may be as to how the nitrate of silver acts, there is, fortunately, no question as to the practical results. This has been determined by exactly recorded cases, which can be counted by the thousands; not observed by one practitioner, but by many; and especially we have lists showing the effect of treatment without this method, as well as with it."

In 1887 Dr. Lucien Howe, of Buffalo, N. Y., chairman of the Committee on Ophthalmia Neonatorum, of the American Ophthalmological Society, presented to that body, and to the New York State Medical Society, a masterly array of facts concerning the prevalence of ophthalmia neonatorum and the means adopted for its regulation in European countries together with what statistics were available in the United States. The conclusions drawn from his examination of the pupils in the New York State School at Batavia were especially pertinent. Doctor Howe did not succeed in legislating for compulsory prophylaxis, but, as a consequence of his earnest work, the New York Legislature, in 1890, enacted a measure (amended in 1892), requiring that the birth infection of the eyes of infants be reported to boards of health.<sup>7</sup>

<sup>6</sup>We are told that in 1874 there were in his hospital 323 births, with forty-five cases of ophthalmia neonatorum—i. e., 13.6 per cent.; and in 1882, with 260 cases in which the method was used, but one case developed—i. e., 0.5 per cent. From 1880 to 1883 the percentage ranged from .49 per cent. to zero. In three years 1160 children were born alive and but one, or at most, two cases showed the disease. Lucien Howe ("New York State Journal of Medicine," 1906) collected statistics of 1776 cases having no prophylactic treatment and 9.2 per cent. developed the disease, and of 24,724 treated by the Credé method only .65 per cent. developed the disease.

<sup>7</sup>New York "Howe" Law:

1. New York State Midwife Law (extract from Penal Code), Chapter 325, Laws of 1892.

This bill soon became known as the Howe law and was copied by sixteen other States. Legislation so fundamental in its requirements, and marking the first step in concerted action looking toward the prevention of blindness in the United States, was accorded hearty indorsement by the ophthalmologists, but was overlooked or soon forgotten by the general practitioner. While our ablest ophthalmologists are the first to deplore the fact that "we have no standard by which may be determined the qualifications of a physician who undertakes such expert and delicate work, and work requiring such precise and technical knowledge as ophthalmology," it is to these men that we owe the inception of the campaign for prevention. Professional etiquette has too long held them from arraigning the medical profession. A moment's reflection will show that, as the germs may not manifest their presence for several days, occasionally, even so late as the tenth or twelfth day after birth, the disease may reach a critical condition without attracting the attention of any one competent to realize the danger to the child's eyesight, especially where the doctor's visits are infrequent, or the accoucheur or midwife does not see the child after officiating at its delivery.

Who is responsible for the ignorance and neglect which perpetuates this needless crippling of human life? It is clear who pays the penalty—the helpless babies.

Laws, unless enforced by an enlightened public conscience, do not avail, and not until the dawn of the twentieth century have the people been alive to public health measures. To Dr. F. P. Lewis, for many years president of the Board of Trustees of the New York State School, at Batavia, and chairman of the New York State Commission to investigate the condition of the blind (1903-1906), came the inspiration of a national, and possibly international, campaign for the prevention of blindness. He has subsequently blazed the path for such a far-reaching movement, the first step of which

2. Section 288. Unlawfully omitting to provide for child. A person who . . .

3. Being a midwife, nurse or other person having the care of an infant within the age of two weeks neglects or omits to report immediately to the health officer or to a legally qualified practitioner of medicine of the city, town or place where such child is being cared for, the fact that one or both eyes of such infant are inflamed or reddened whenever such shall be the case, or who applies any remedy therefor without advice, or except by the direction of such officer or physician; or

4. Neglects, refuses or omits to comply with any provision of this section or who violates the provisions of such license, is guilty of a misdemeanor.

was taken in 1906, when the American Medical Association<sup>8</sup> appointed a committee, consisting of an ophthalmologist, an obstetrician and a sanitarian, with Doctor Lewis as chairman, "to carry out, through the associated medical organizations of the nation, measures for the prevention and control of birth infections."

The above-named committee, in their report to the House of Delegates of the American Medical Association, in 1908, which was unanimously approved by that body, and also, later, by the American Academy of Ophthalmology and Oto-Laryngology, made detailed recommendations, which may be summarized as follows:

(1) Require registration of births; licensed midwives, to be under control of board of health; they and physicians being required to report each case of disease.

(2) Let boards of health issue circulars of instruction to midwives and mothers.

(3) Let health boards circulate tubes containing prophylactic, with directions for use.

(4) Insist on complete records in all hospitals and maternity institutions.

(5) Periodic reports by all physicians on all cases treated.

(6) Educate the public.

(7) Organize the medical profession throughout the country.

(The suggestions have reference to ophthalmia neonatorum only.)

The state committees of physicians suggested in the last recommendation (No. 7) were appointed, and the next step was to secure the co-operation of a national lay organization to promote this preventive work. Accordingly, in December, 1909, the chairman of the Committee on Ophthalmia Neonatorum of the American Medical Association<sup>9</sup> applied to the Russell Sage Foundation, which had, in 1908, in consequence of the interest aroused by the New York commission's report which appeared in 1907, created a committee on prevention of blindness, with Miss Louisa Lee Schuyler as chairman. This committee, except for its part in the formation of the special committee now working under the auspices of the New

<sup>8</sup> The American Medical Association, probably the strongest professional society in the country has a membership of between 20,000 and 30,000 physicians, and through its organ, the "Journal," it reaches 53,000 physicians.

<sup>9</sup> This committee is now known as a Committee on Prevention of Blindness.

York Association for the Blind, and organized for preventive work in the State of New York, had thus far remained inactive, but responded at once to Doctor Lewis' request, appropriated funds and, later, chose an able secretary, Samuel Ely Eliot, with headquarters at 105 East Twenty-second Street, New York City. Mr. Eliot is now traveling through the West, organizing, with the indorsement of the medical profession, co-operative committees for the prevention of blindness in those States where no work of the kind exists.

Previous to this time, and acting upon a suggestion made by Miss Lucy Wright, the general superintendent of the Massachusetts Commission for the Blind, the Russell Sage Foundation Committee, in February, 1910, called a conference for the purpose of pooling the information and experience acquired in the several States already carrying on preventive work. A second conference was held, December, 1910, and resulted in the formation of a national association for the prevention of blindness and conservation of vision. This body invites the co-operation of societies now in existence, or hereafter formed, for advancing the welfare of the blind; for the promotion of social purity and sex education; for preventing infant mortality, and for safeguarding industrial occupations. In addition, this association asks the aid and indorsement of state and national medical societies, of the National Educational Association and other educational bodies, of the public and private schools for the blind, of commercial bodies, of labor organizations, of women's clubs, and of all the other organizations dealing with social and economic problems in:

- (1) The prevention of infantile blindness.
- (2) The prevention of blindness from industrial and other accidents and from disease.
- (3) The conservation of vision through improved hygiene during school life, and in industrial occupations.

Ophthalmia neonatorum as a cause of blindness is the first to be attacked, because of its susceptibility to legislative regulations. New York State, as has been mentioned, has a special committee and executive secretary to carry on this work, and has a collection of lantern slides and photographs, the latter of which have been loaned to numerous States as a traveling exhibit.<sup>10</sup> Massachusetts,

<sup>10</sup> Loan Exhibit and lantern-slide circular of Committee on Prevention of Blindness, New York Association for the Blind.

under the direction of the State Commission, employs a field agent for prevention of blindness and conservation of eyesight.<sup>11</sup> The unique social service work at the Massachusetts Eye and Ear Infirmary is referred to later. The Ohio Commission has conducted intensive lecture campaigns, supplemented with extensive newspaper stories circulated through the State Press Association. Maryland has an association devoting its entire attention to the prevention of blindness, and the Pennsylvania Association for the Blind makes work for prevention one of its important activities.

It has been the general belief that the midwives were the most culpable offenders in the eye disasters of infants. In most of our large cities and elsewhere, among the foreign-born population, a large proportion of the births are attended by these women, who, nine times out of ten, are incompetent and unclean. The 1904 records in Chicago show that 86 per cent. of all births were reported by midwives, and in New York City, in 1907, 43.5 per cent. were so reported. The investigations of Miss Elizabeth Crowell, of the New York Association of Neighborhood Workers, who personally visited five hundred midwives in their homes, brought to light indescribable conditions of filth. She found but fifty (one-tenth of the whole number interviewed) who could be qualified as capable and reliable.

The study of midwifery presented by Miss Carolyn C. Van Blarcom, the executive secretary of the Committee on Prevention of Blindness of the New York Association for the Blind, at the second Russell Sage conference, followed by the adoption of a resolution presented by Dr. William N. Studdiford, of the New York City Board of Health, to the effect that "this conference of workers for the prevention of blindness recommend that measures be taken in this country to secure state legislation which shall provide for the training, registration, licensure,<sup>12</sup> supervision, regulation and control of women engaged in the practice of midwifery," led to an offer by Dr. John Winters Brannan, president of the Board of Trustees of Bellevue and Allied Hospitals, of New York City, to co-operate in furnishing the first training for midwives in this country.

While the midwives have probably received no more condemnation than they deserve, the general practitioner, too, comes in for a generous indictment.

<sup>11</sup> See articles by Henry Copley Greene, in "New Boston."

<sup>12</sup> The license should not be regarded as a diploma, but as a sanitary police measure maintained by the board of public health.



A unique social-service work, introduced at private expense by Miss Annette P. Rogers, of the Massachusetts Commission for the Blind, and now a part of the régime of the Massachusetts Charitable Eye and Ear Infirmary,<sup>13</sup> is under the able direction of Miss Katharine Brannick, who, after a study covering three consecutive years, brought to light the startling fact that of a total of 275 carefully investigated cases<sup>14</sup> of ophthalmia neonatorum, eight births only were attended by midwives, sixty-two by hospital, dispensary, and city physicians, and 205 by private practitioners! Two cases in one year, in the practice of one man, in which both babies were blinded!

Another investigation recently made in Massachusetts, under the direction of the Boston School for Social Workers, disclosed the fact that out of ninety-seven doctors visited, with large obstetrical practice, "twenty-seven always used a prophylactic; forty, seldom; twenty-eight never used a recognized preventive, although the last admitted that they sometimes employed warm water, lemon juice, citric acid, lard, camomile tea, etc."! "Of twenty-seven cases of ophthalmia neonatorum visited by nurses in the summer of 1909, under the direction of the New York City Department of Health, twenty-two were traced to physicians and five to midwives. In thirty-three cases of ophthalmia neonatorum investigated by a field worker in the New York School of Philanthropy (1909-1910), it was found that twenty-two cases had occurred in the practice of physicians and eleven in the practice of midwives. Only one of the twenty-two physicians in question had used a prophylactic at birth, while three of the eleven midwives employed prophylaxis as a routine." Of 5,949<sup>15</sup> births in five Massachusetts cities in 1909, only 17 per cent. were given at birth any preventive treatment; 41 per cent. were attended by physicians who use a prophylactic only as their judgment dictates, and the remaining 42 per cent. were attended by physicians who never use a prophylactic for ophthalmia neonatorum.

Such facts would seem to argue strongly for the universal use of a prophylactic, for, as Doctor Richardson points out, "the possibility of any baby becoming infected at the time of confinement should be

<sup>13</sup> The Massachusetts Charitable Eye and Ear Infirmary has had since 1898 a ward devoted to the care of ophthalmia neonatorum.

<sup>14</sup> This figure does not represent the total number treated at the Massachusetts Eye and Ear Infirmary, but simply those investigated.

<sup>15</sup> Sight Saving Bulletin No. 7, Massachusetts Commission for the Blind.

constantly borne in mind, and it is desirable to carry out a routine preventive treatment in every case."

The agitation for the prevention of blindness carried on by commissions and other bodies organized to promote the interests of the blind has brought to light the Howe law in several States and secured its enactment in others. In addition, New York, Massachusetts, Ohio and Rhode Island provide, through their state boards of health, for the free distribution of a prophylactic.<sup>16</sup> While not sufficiently inclusive, both these measures are of value not only in their direct results, but in their educational bearing on the question. The latter makes easily accessible to the practitioner the means of prevention and his intelligence and conscience force him to use them in questionable cases at least. The first measure—the Howe law, although written on the statute books of seventeen States, has, unfortunately, been enforced in a few localities only. Massachusetts has one of the best of these revised laws, in that it places upon the physician, as well as other attendants, the responsibility for the report of the infection. Furthermore, it provides that, when reported, the board of health shall take such immediate action as it may deem necessary, in order that blindness may be prevented. Yet in 1907-1908—two years after the law was passed—out of forty-six investigated cases, only one was reported. During 1909-1910, in three cases resulting in blindness, a report was made to the board of health by the attending physician, and no action was taken by either to insure proper care! The excuse often given for failure to report cases of ophthalmia neonatorum is that, in so doing, unpleasant reflections may be cast upon the parents. The Massachusetts Commission's Bulletin No. 3, widely distributed, judiciously points out that "gonorrhœa, however, is not necessarily the cause of these symptoms; and as the law wisely deals with symptoms only, and not with diagnoses, neither nurses nor physicians should be afraid that, by obeying the law, they will put any stigma on the child's family."

But, somehow, in some way, let us make the parents realize that their blinded child is a disgrace which cannot be hidden. Dr.

<sup>16</sup> The best form in which the writer has seen the silver nitrate put up is a small, flat, dark-colored gelatin capsule, with a celluloid cap, which can be pierced with a sterilized needle. These small receptacles contain just enough for one application, and are put up in boxes of 10 each. (Prepared by Schieffelin & Co., of New York.)

Robert L. de Normandie, in speaking of this phase of the subject, courageously says: "If there is the slightest doubt of the parents' character, it is the State's duty to compel the infant's health to be safeguarded in every possible manner."

The latest word from Massachusetts announces the prosecution by the Boston Board of Health of four physicians failing to report cases of inflammation of the eyes in accordance with the law. Three were convicted. In March, 1910, the conviction and fine of a midwife in Cleveland, Ohio, was conducive of much good not only in revealing the power of the law to the woman's confreres, but in the wide publicity given the case through the press. Mothers in distant parts of the State appealed to the authorities for aid for their babies' "sore eyes." If, by prosecutions, convictions or other means, the reporting law can be kept before the public, no doubt much good will be accomplished.

Workers for prevention, however, feel that the root of the matter is not yet reached. The negligence of physicians and midwives in reporting their cases of birth infection has brought up the whole question of birth registration, which is most inadequate in the United States. A system of birth registration accounted reliable by the United States Census Bureau is maintained by eighteen States only. This so-called registration area covers but 55 per cent. of the population of the United States. The systems, or, rather, lack of systems, in the rest of the States and Territories would be difficult to match in any other civilized country. Most of the eighteen States referred to require the birth certificate to be sent to the Board of Health within ten days. Formerly, when records were required but quarterly, accumulations of birth certificates were sent to the recorder months after the birth of the child. Even now, with the ten-day limit, the death certificate is sometimes received before the birth is officially announced. Pennsylvania is the only State within our knowledge where the State Health Board's staff includes a birth registry inspector. This man is a field officer who investigates doubtful localities, endeavors to compare the infant population as he finds it with the neighboring registry office's records. If they fail to check up, he pursues his inquiries to locate the doctor or other attendant who omitted to send in the birth certificate. It can readily be understood that even a few cases probed to the discovery of the delinquents would have a stimulating effect on the

whole neighborhood. The Health Department of Pittsburg now employs such an inspector for that city alone.

The adoption and enforcement in every State of a ten-day limit for registration of births would be a distinct step in advance, and would give accurate figures for the compilation of statistics. If this requirement were coupled with a law making the use of a prophylactic compulsory and universal, ophthalmia neonatorum might soon cease to handicap our race. But while the first measure seems reasonably sure of materialization in the near future, the second seems less hopeful of achievement, and, as has already been shown, ophthalmia neonatorum may claim the eyesight, if not the life, of the next generation long before the expiration of the ten days!

The law requiring that birth infections of the eyes be reported to the health authorities does not strike deep enough; at best, it deals with the treatment and cure of the disease. We are committed not only to labor to prevent the loss of sight, but also to prevent the appearance of the causal disease. The free distribution of a prophylactic in the few States before noted is, perhaps, the entering wedge to its universal use, but at present the distribution acts principally in an educational way. How can we more effectively *prevent* infection without making compulsory the use of a prophylactic?

Two substitute measures suggest themselves:

First, earlier registration of births; *e. g.*, a twenty-four to thirty-six-hour limit for the receipt of the record at the office of the Board of Health. This plan has great merit in that the questions on the birth certificate may be in themselves a reminder of treatment while there is yet time. In the New York birth report the question is asked, "Did you employ a preventive for ophthalmia neonatorum? If not, why not?" In Indiana the query is inserted, "Were precautions taken against ophthalmia neonatorum?" Now, that health officers in each State are co-operating, similar questions will, doubtless, appear on the birth certificates in every State in the Union. With this early registration there is still time for the health authorities to send to the physicians and midwives warnings such as the data on the birth certificate demands. New York has secured a reduction in the time limit of birth registrations from ten days to thirty-six hours. This law obtains throughout the State, excepting New York City, Albany, Brooklyn and Yonkers. Some physicians in large cities where such reduction in time has been proposed



either feel themselves competent to handle the matter without the interference of the health authorities, or are so overburdened with their daily work that they resent the additional labor involved under the twenty-four to thirty-six-hour time limit.

To meet this objection on the part of the busy practitioner and to accomplish practically the same end, a second suggestion has been made, namely that the accoucheur should send to the health authorities a notification within twenty-four to thirty-six hours of the birth of a child; such notice might even be given by telephone. Dr. Cressy Wilbur, at the recent conference in New York, pointed out the value of such a proceeding, and made it clear that such notification was distinct from the registration containing detailed information, which would follow within ten days. The warning returned by the board of health after the receipt of notification could not be so specific as that which could be given after the receipt of the registration, with its definite question regarding ophthalmia neonatorum, but, as it is hardly possible that each case would receive individual inspection, the *early notification* would serve the purpose of *early registration*, in one respect; namely, to get the fact of the occurrence of a birth to the authorities promptly, that the board of health may expeditiously point out the danger of neglected "sore eyes," and call attention, likewise, to the other diseases which imperil the life and vitality of the infant.

But doctors object to being made responsible for the handing in of two certificates, however simple the first. A precedent which might be followed to reach an equitable solution of the matter is found in the English law, of August 28, 1907, Chapter XL, which places the responsibility for the early notification,<sup>17</sup> first, upon the father, and in case of his absence, upon the attendant. The justice of such an arrangement is self-evident. The primary cause of the disease, in the large majority of cases, is directly traceable to the father. The parents, not Providence, are responsible for the birth of the child, and also for the transmission of diseases which make the gift of life not a blessing, but a curse. The time for glossing over such facts is past. In our indictment for criminal carelessness and ignorance in the treatment of disease we must surely include, with the doctor and midwife, the parent.

<sup>17</sup> The suggested 24-hour postcard notification is not a substitute for subsequent registration.



In addition to giving the fact of the child's birth at a particular address, the notification should also state the language read by the family. The local board of health could then send by return mail a vividly set forth circular with simple statements printed in the appropriate language and calling attention to the symptoms of ophthalmia neonatorum and giving a warning that, without *prompt, expert medical care*, a child runs the risk of being blind. The early notification has another argument in its favor, for the same circular which serves to warn against ophthalmia neonatorum might also caution the mothers with regard to two other diseases—puerperal, or “child-birth,” fever, and infection of the mother's breast, which, while not endangering the eyesight of the child, deprive him, if they go unchecked, of his best source of nutrition, thus rendering him less able to withstand the encroachments of disease. In this age of conservation, it would certainly seem as if our future citizens should receive as much protection at birth as is given them when disease has developed. Is it not time to bring the knowledge of such diseases out into the open and beseech the aid of the press, the pulpit, and the platform in attacking them vigorously? Shall not those of us who are fathers or mothers unite to protect our children from these insidious foes? The enforcement of a law in each State isolating syphilis and gonorrhœa as infectious contagious diseases would mean real progress in the prevention of blindness. In the meantime let us not deceive ourselves. It is not alone the child known to have vicious surroundings who needs to be rescued—ALL CHILDREN need to be safeguarded by intelligent and noble teaching. The policy of purity through ignorance of evil is no longer tenable. Innocence of evil through knowledge purely imparted must be our slogan for the future.

## THE WARFARE AGAINST INFANT MORTALITY

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Health is fostered by legislation and education, the one compelling and the other prompting us to seek it. The citizens of a country need laws, rules and regulations to assure to them protection, comfort, happiness and health, but the needs of the child are vastly different from those of the adult. The country which first recognizes its responsibilities to the child, and tries to fulfil those obligations will receive the recognition of the world as being the foremost civilized nation. The United States is awakening to such realizations when it contemplates a National Child Welfare Bureau. Such a department would not make laws to correct existing evils and defects, but it could collect existing data on the care of the child, study the most practical and efficient methods for its welfare; codify, simplify and place to their full and proper use existing laws. It would encourage individual investigations, and could teach state and municipal health departments and children organizations how they can best use their resources.

There is little sense in urging an increased birth rate when we do not know how to keep alive and healthy those children born. Our knowledge of food values and rational practical infant feeding is vague. Food and feeding seem too commonplace for most of our scientists to devote time to. Millions of dollars are given for research work on tuberculosis, pellagra, and other diseases that have been much advertised but are far less destructive to our population than the preventable diseases of infancy. While the important causative factors of many of these deaths are ignorance and superstition, improper feeding is the chief one.

The least read volumes published are health reports. This is true even among those whose duty it is to read them. Figures make uninteresting reading, and the more so when you must dig out that which is of value. A study of the Mortality Statistics, Bureau of the Census, United States, 1909, answers the question,

why we should be aroused to activity. A total of 140,057 babies under the age of one year, died in 1909, in the registration area reported upon by the United States Census Bureau. This area is approximately about fifty-five per cent of the population. Of this number of deaths, the diseases of early infancy claimed 33,274, including premature births and congenital debility, malformations 7,286, and respiratory diseases 22,990, of which pneumonia has 17,549. Tuberculosis of all forms claimed 2,406, and epidemic diseases 7,132. Convulsions, which means no correct diagnosis made, is charged with 4,613, and other ill-defined diseases 6,615. Diarrhea and enteritis tops the list with a score of 36,516, while other diseases of the digestive tract adds 4,645.

An intelligent comprehensive study of these statistics is necessary to plan our lines of defense. We must separate those diseases which are preventable from the wholly inevitable ones. Better and more accurate statistics are needed, especially on births. Infant mortality should be compared to infant population or the number of births. Full accurate statistics are at present not available. Accurate death certificates, recording the correct cause of death would lead our activities in the right direction. While some of the diseases causing infant deaths are classified as non-preventable or inevitable, they are, to a varying degree, preventable. The deaths from premature births and congenital debility may in coming years be greatly lessened by the education of the public on such questions as the social evil, also by the teaching of the expectant mother and placing her in better physical and hygienic conditions to meet the requirements of her approaching motherhood. The same problems that are to be considered in the premature births and the deaths of earliest infancy are important for that vast unrecorded number of infants not born. The fetus which is destroyed after the time of viability, the loss of "the possible infant" is not only adding to an unregistered infant death rate, but also making the mother less able to meet the needs of future child bearing. The plea that these earliest deaths are fortunate in that they give us the "survival of the fittest," is erroneous. That we are saving and prolonging the lives of a lot of weaklings is true only in a very narrow sense. The gardener destroys the undesirable blooms to give a hardier plant, but he studies how to obtain from the seed only the best and strongest plants.

Respiratory diseases, among which pneumonia is the arch enemy, are greatly preventable by the education of the people in the value of fresh air, the need of dressing the child according to the variations of temperature and humidity, and the improving of the housing, sanitary and living conditions. Tuberculosis and epidemic diseases are to a great extent preventable, while diarrhea and enteritis, with 36,516 deaths in the first year of life, is almost wholly preventable. This is the disease against which most cities have directed their energies. Summing up the deaths at all ages from all causes, we find that one-fifth of these deaths are among infants under one year of age, and one-fourth under five years. Of this death rate, one-half die in the first six months of life. The sad feature of this record is one-half of these deaths among infants are unnecessary and preventable. The inhabitants of the United States are not the only ones who have this perplexing problem to solve, for while some other countries are more fortunate, others are less so. Study the accompanying statistics from the various countries of a civilized world, and then ask if some urgent action is not necessary. In one year a grand total of 3,243,958 deaths in the first year of life. This means a baby dies somewhere every ten seconds, 360 every hour, and 8,640 every day; *and one-half of these deaths are preventable.*

Out of every 1,000 births, the following number of children will die in their first year of life in various countries forming the civilized world. (Compiled from the averages of ten years.)

Country.	Deaths under one year to 1,000 births.	Deaths under one year actual numbers.
Chili .....	326 .....	30,303
Russia (European) .....	263 .....	1,298,245
Austria .....	222 .....	200,553
Roumania .....	218 .....	49,589.
Hungary .....	212 .....	154,100
German Empire .....	197 .....	374,153
Jamaica .....	181 .....	6,414
Ceylon .....	179 .....	23,255
Spain .....	170 .....	106,649
<b>United States (1900 approximated) ..</b>	<b>165 .....</b>	<b>280,000</b>
Italy .....	161 .....	83,970
Belgium .....	154 .....	28,499
Japan .....	153 .....	220,013

Country.	Deaths under one year to 1,000 births.	Deaths under one year actual numbers.
Servia .....	153 .....	16,268
France .....	148 .....	115,378
Bulgaria .....	144 .....	23,577
Canada .....	140 .....	8,200
Great Britain and Ireland .....	139 .....	147,660
Switzerland .....	138 .....	11,441
Holland .....	138 .....	19,209
Finland .....	133 .....	10,877
Western Australia .....	127 .....	756
Denmark .....	124 .....	8,089
New South Wales .....	99 .....	3,745
Victoria .....	98 .....	2,299
Sweden .....	96 .....	1,197
Queensland .....	94 .....	1,120
Tasmania .....	93 .....	433
South Australia .....	93 .....	608
Norway .....	86 .....	4,231
New Zealand .....	76 .....	2,233
Grand total .....		3,243,958

The following statistics tell most graphically what the chances are for any one at a certain age, to live. Note that the infant under one year has the same chances as one who has passed the biblical allotment of three score and ten, as the death rate at these periods are about the same.

#### DEATH RATE AT EACH AGE PERIOD

(U. S. Census, 1890-1900.)

	Death Rate.	
	1900.	1890.
<b>Under one year</b> .....	165.4	205.8
1 to 2 years .....	46.6	84.9
5 to 9 years .....	5.2	7.3
10 to 15 years .....	3.3	3.8
25 to 30 years .....	8.6	9.9
45 to 50 years .....	15.2	16.5
60 to 65 years .....	35.1	32.8
70 to 75 years .....	75.2	64.5
<b>80 to 85 years</b> .....	165.8	144.6
90 to 95 years .....	339.2	260.0
95 and over .....	418.0	347.1



We can truly believe "the business of being a baby must be classified as an extra hazardous occupation." We have so far focused our attentions and sympathies upon the great number of deaths among infants, but how about the living, those who through ignorance or neglect in the early years of life, in that great important formative period, the time of building the foundation, are made to swell our lists of weaklings and invalids, to fill our institutions and hospitals. "The magnitude of the loss by death is also an index to the amount of harm inflicted on the living." Our national forests and waterways are of importance and claim the attention of our government, but we must not forget the value of our resources is dependent on the citizens that foster them. "The child is our greatest national asset. Let conservation begin at home."

Several countries, for years, have deplored their decreasing birth rate. Startling statements have been made as to the possible passing of certain races. They watched closely the coming of the race, but overlooked the going. "It is not the babies born, but those saved that count." Governments are beginning to learn from those who are responsible for the health of the population that "every child born healthy is entitled to become a normal, healthy and useful citizen."

What is being done to battle with the mortality among infants? Ignorance, neglect, superstition and poverty are known factors of causation. Pure, clean food and proper feeding are necessary for the infant. Statistics prove that one breast-fed infant dies to every ten artificially fed. The physician, the midwife and the mother must be taught the necessity of breast feeding. The child must not be deprived of this hereditary right on the least pretext. This need was forcibly impressed on all who visited the exhibit at Baltimore. Here was displayed a large photograph of a mother with her infant at the breast and bore the inscription "This Baby is getting a Square Deal." Is yours? Of course there are some cases in which the mother is unable to nurse her child. Many of these would have had the necessary nourishment if in the last stages of pregnancy the mother had been taught the proper hygiene of this period and if she had the proper nourishment for herself. Philadelphia has succeeded along these lines through the visiting nurses caring for expectant women. Where poverty existed the mother was given milk free, and placed in the best hygienic con-

dition. If she was compelled to work in a factory at this critical period, one of the charitable organizations was appealed to. Ignorance and superstition have been met with campaigns of education. Many cities in this country employ for this purpose literature. Tons of circulars and pamphlets, printed in all languages, have been distributed especially in the congested and foreign districts. It is questionable if these accomplish much good.

Attractive posters and wall cards, with instructions for mothers, have been successfully used in several cities, including Philadelphia, New York, Chicago and Boston. A most potent means of education is the consultations and clinics, especially for advising the parents of well infants. These have been copied after similar institutions existing for years in France. They are held at milk stations, hospital dispensaries, schools, and in open-air tents especially constructed for this purpose. New York, Boston, Cleveland, Rochester, Chicago and Philadelphia have such clinics in operation. Much of their success depends upon having physicians and nurses in charge who are interested and trained in this particular field of work. Education is a slow process and all the more so among foreigners handicapped by environment and superstition. Results are obtained by utilizing the public schools, teaching the older girls who are the future mothers. These girls also succeed in carrying home sufficient of the information to make a decided impression on their parents. Again the older child, especially among the poor, is the caretaker of her younger brothers and sisters.

The most valuable weapon against infant mortality is the trained visiting nurses and physicians, who enter the homes. They observe the true existing conditions and apply the remedies to the defects. They teach the people healthful living and correct unsanitary conditions. They prevent illness and care for the sick. To keep the well child in good health is most important, but we must also assure proper nursing and medical care to the sick infant. The wealthy can give their offspring the advantages of the services of specialists and trained nurses, while the poor are dependent on the dispensaries and hospitals. An investigation during the past summer in Philadelphia showed the hospitals to be sadly inadequate in their facilities for caring for the sick infants of the

poor. A similar investigation in other large cities may prove astonishing.

The Department of Public Health and Charities of Philadelphia, under its director, Dr. Joseph S. Neff, overcame some of this deficiency by establishing during the past summer, two refuges for babies on the recreation piers, situated on the river front. Four trained nurses, two to each pier, cared for the sick infants sent there by the nurses visiting the homes and by the attending physicians. These stations were open day and night, were practically open-air hospitals, and proved one of the most successful undertakings of the campaign.

Pure, clean and fresh milk is an absolute necessity to conserve the health of infants. This is a most serious problem with all cities. The magnitude of the task to procure a supply of good milk for a large city can be realized from the following facts: The daily milk supply of Philadelphia is 400,000 quarts, and an annual of 146,000,000 quarts. This is handled by 3,000 milk dealers and 5,000 producers, scattered in four different states. It is brought to the city by three railroads, a trolley company and innumerable wagons. Chicago requires a milk supply daily of almost 1,000,000 quarts, which is produced on 12,000 farms, by 120,000 cows. This production comes from five states. The supply for New York comes from 35,000 farms, located in six different states, and is shipped from 700 dairies. The study of this food supply, which is one of the gateways to success in reducing infant mortality, would make hundreds of volumes of literature. Philadelphia bids fair to reach a solution of the problem by the work of a recently appointed commission on milk. This commission was appointed by the mayor, through the efforts of Director Neff, the Bureau of Municipal Research, and others interested in the subject. They are studying exhaustively all phases of the situation. One thing is evident, that milk, when received, which is poor in quality can never be made suitable food for infants, and the best milk produced can be made worthless and dangerous when improperly handled after it leaves the producer. This neglect or ignorance may be in the shipping, with the dealer, or at the home. Lack of proper refrigeration seems to be a crucial point in most of the troubles. The time must come when cities will recognize it to be their duty to estab-

lish milk stations under their supervision, to supply the infant population with this necessity of life.

Milk stations to supply pure clean milk for infants have been maintained in a number of American cities. This milk is generally pasteurized and modified to suit various ages. These have in all cases been started and maintained by individuals and philanthropic organizations. New York's recent budget appropriation of \$40,000 for the purpose of establishing fifteen infant milk depots with equipment and machinery, is most commendable and an important step in the right direction. There is no doubt that a city owes to the health of its infant population the guarantee of pure, clean milk, and this is the most practical plan to obtain it. Philadelphia has been fortunate in possessing an institution known as the "Philadelphia Modified Milk Society," which was organized in 1903 through one of its enterprising newspapers, which accepted the offer of a \$5,000 plant from Mr. Nathan Straus, of New York. The society has been maintained and steadily increased its usefulness mainly through this same newspaper. It should be known, however, that at no time did they use the project as an advertisement. During the summer of 1910 the society met every request of the Health Bureau, and maintained eighteen distributing stations, including one on each recreation pier. The great demand for such a commodity and the scope of the work can be realized by the report from June 1 to December 31, 1910. During this period there were distributed 760,847 bottles of modified milk.

To best cope with the many and intricate problems arising to reduce infant mortality needs a division or bureau under the health department, especially equipped to meet the needs of the child. A Bureau of Child Hygiene is the logical outcome of these needs. In close relation to infant mortality is the licensing and supervision of midwives, lying-in maternities, and homes for boarding or keeping infants. The supervision of midwives, controlling those who are unfit for such duties, and teaching others is a most important duty. One can realize the folly of overlooking the midwife as a factor when from 30 to 85 per cent of the deliveries of infants in large cities are in the hands of these women. This custom of employing midwives is almost universal among the foreign population, and exists in the rural districts as well as the cities. A study of this work in Philadelphia shows that the intelligent care



of the infant by most of these women is most sadly lacking. Not only does it contribute to the mortality, but much of the blindness among infants can be traced to their neglect.

A concrete illustration of what can be accomplished by a well-organized and practical campaign was afforded by Philadelphia in the summer of 1910. Dr. Joseph S. Neff, director of the Department of Public Health and Charities, reports as follows on the Philadelphia experiment:

As a result of the provision of councils for the employment of eight municipal nurses and the appropriation of moneys for general expenses in connection therewith, and the aid rendered by various private associations in the summer campaign to preserve infant life, the statistics of the office show that during the past summer there has been forty per cent less mortality in infants under two years of age in the Second, Third, Fourth, Fifth and Nineteenth wards where efforts were concentrated, as compared with the rest of the city. The entire city benefited by the publicity campaign, the erection of new milk stations, and the work on the two city piers.

Medical inspectors of the bureau of health delivered lectures in the spring in the public schools, illustrated by paraphernalia used in the care of the baby, applied to living subjects in the presence of the older girls and their parents. Education of the mother was continued in the homes by personal instructions and demonstrations by the nurses.

#### *Milk Stations Helped*

The milk stations, too, were made educational centers and many medical clinics were established. Exhibits on the care of the baby were most effective teachers. They were placed in milk stations, schools, city piers, and other institutions and consisted of graphic charts, display cards, photographs, sketches and models which depicted the proper hygiene and care of the infant.

The department acknowledges its obligations to many private associations for their co-operation and the aid rendered in this movement. The Philadelphia Modified Milk Society responded to our every request to open new milk stations, which they did in eight separate instances and that without cost to the city. The Bureau of Municipal Research supplied two nurses and one clerk; the Visiting Nurse Society, two nurses; the Phipps Institute, one nurse; Starr Center, two nurses; Baby Alliance, one nurse; the Lighthouse, two nurses, all of whom reported directly to the municipal department having this campaign in charge, and worked in conjunction with the municipal visiting nurses.

In addition there were several private activities working independently along the same lines. Classes of mothers were held once a week in several sections and prizes were given by the Baby Alliance and the Lighthouse to mothers for those babies showing best results. Some of the best work in



this line was done in the Twenty-second and Fifteenth wards, under the charge of ladies interested in the movement.

As a result of the efforts of the department, through newspaper articles and public exhibits of soothing syrups and babies' comforters containing opium or more dangerous drugs, the Philadelphia Association of Retail Druggists passed resolutions indorsing the position of the department and condemning and discouraging the sale of these remedies by their members. This action was most magnanimous and has been lived up to by the druggists of Philadelphia. This movement has been far reaching as it was reported by the Associated Press and started similar movements in many other cities in the United States.

The following summary gives some idea of the amount of work performed:

*Work Performed by the Visiting Nurses*

Number of visits:

Original visits for investigation and instruction .....	9,528
Special nursing visits .....	10,414
Revisits .....	8,213

Total number of visits .....	28,155
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Number of sick infants given nursing care .....	5,043
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Number of expectant women instructed .....	745
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Disposal of cases:

Referred to dispensaries or district physicians .....	1,635
Sent to hospitals .....	95
Sent to country or seashore .....	53

Cases received at central office:

Number of calls to sick infants .....	503
Number of cases of destitution .....	71
Number of cases referred to various organizations .....	134
Number of deaths among cases attended by nurses .....	26

*Work Performed at Recreation Piers*

Chestnut Street, opened July 25; Race Street, opened August 3; closed October 8:

Number of sick infants in attendance .....	2,434
Number of well infants in attendance .....	2,014
Number of older children in attendance.....	3,593

Total attendance .....	8,041
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Number of caretakers instructed .....	2,681
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Bottles of modified milk dispensed at piers .....	13,449
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In this, as in other medical work, the needs of the poor cannot be overlooked. Besides the cases of destitution referred to the various charitable organizations, there were distributed in the homes of those too poor to pay for it about 25,000 quarts of milk and 100,000 pounds of ice.

A study of its causes and methods of prevention of the enormous number of preventable deaths among infants most clearly shows that the work is not for any one class of people, but requires the united and persistent efforts of all, health authorities, federal, state and municipal, physicians, teachers, sociologists, philanthropists and every one who has at heart the health, happiness and prosperity of the nation.

## BOOK DEPARTMENT

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### NOTES

**Addams, Jane.** *Twenty Years at Hull House.* Pp. xvii, 462. Price, \$2.50.  
New York: Macmillan Company, 1910.

**Alston, L.** *Education and Citizenship in India.* Pp. ix, 222. Price, \$1.25.  
New York: Longmans, Green & Co., 1910.

The object of this volume is to present the relation of the educational system to conditions in general, but mainly to political activities in British India. The personal experience of the author as a teacher in the Indian schools adds weight to his arguments.

The discussion is made under four general heads: first the social and religious environment in which the educational system has been placed; second, the system itself, with its defects; third, the effects of the system as indicated by the characters of the educated natives, and fourth, the political activities and aspirations of the educated classes with the relations of these activities to the system of education.

Some of the important points concerning the system and its effects are as follows: The indigenous schools (native Mohammedan or Hindu) are mainly theological and unprogressive. The dogmatic teaching of religion is excluded from the government schools and should rightly be. The universities are primarily examining bodies, not teaching bodies. Hence the cram evil is very great. As it stands the system is inefficient; it unfits for any work except service under the government. The greatest need is for technical education in order to have the system related to the life careers of those who come under it. The educational system cannot be held entirely responsible, for the unrest and disloyalty of the educated classes, on the ground that it has failed to develop a high sense of political duty, but it is one factor tending to foster that disloyalty. On general and on specific grounds, therefore, the system is condemned as unsatisfactory and inadequate, with much weight of opinion and evidence presented by the author to support this conclusion.

**Bryce, James.** *The American Commonwealth.* Two vols. Pp. xxii, 1704.  
Price, \$4.00. New York: Macmillan Company, 1910.

**Butler, N. M. (Ed.).** *Education in the United States.* Pp. xxiv, 1068.  
Price, \$2.50. New York: American Book Company, 1910.

This volume is really a handbook of education. In addition to an introductory survey by the editor, there are twenty monographs by men and women prominent in the educational field. Hon. Elmer E. Brown, United States Commissioner of Education, writes on "Secondary Education;" Andrew S. Draper, the Commissioner of Education in New York, on "Elemen-

tary Education;" M. Carey Thomas, president of Bryn Mawr, on "Education of Women;" Edmund J. James, president of the University of Illinois, on "Commercial Education," to mention only a few of the writers. It will be found a valuable source of information to all who are seeking to know the genesis and present status of our systems of training.

**Cannon, H. L.** *Reading References for English History.* Pp. xv, 559. Pricc, \$2.50. Boston: Ginn & Co., 1910.

**Casson, H. N.** *The History of the Telephone.* Pp. vii, 315. Price, \$1.50. Chicago: A. C. McClurg & Co., 1910.

In this unpretentious but well-printed volume the gradual development of telephony from the instant of birth to the latest phase of its gigantic, modern growth is presented for the first time in a historical and intelligible sequence. The story of this development will interest the technical expert as much as the non-technical reader for whom the book was written. In spite of inevitable condensation the author proves his mastery of the topic by a treatment agreeable in form and of more than passing interest. Apart from the merely personal sidelights upon the men who were most prominently identified with the development of a crude instrument, transmitting vocal sounds more or less intelligibly, to the intricate and delicate but most efficient apparatus which we now recognize as a telephone, perhaps the most markedly interesting chapters are those in which the various lawsuits taken by the holders of the Bell patents against infringing interests are described. Illustrations and portraits render the story vivid, and the book is further enriched by a good index.

**Chesterton, G. K.** *What's Wrong With the World?* Pp. 366. Price, \$1.50. New York: Dodd, Mead & Co., 1910.

The author states plainly the purpose of his work in these words: "I have called this book 'What's Wrong With the World?' and the upshot of the title can be easily and clearly stated. What is wrong is that we do not ask what is right." Instead of being nauseated by realistic descriptions of the sore spots of modern civilization, the reader is agreeably surprised to find an exalted idealism expressed in almost every chapter of the book. Mr. Chesterton admits frankly that things are unquestionably wrong, but the wrongfulness, he holds, consists primarily in wrong thinking. Think right and we will be right is the trite motto to which he adheres. There is but one distinctly unpleasant feature in the book,—the attempt to express ideas in startling, alliterative phrases. For example in one place the author refers in parenthesis to "excruciating eugenics." At another point he says that, "generally speaking, aristocracy does not preserve either good or bad traditions; it does not preserve anything except game." Both statements are, of course, ridiculously overdrawn in order to produce a humorous effect. With the exception of this single feature, the book should commend itself to every thoughtful student of modern social tendencies.

**Coker, F. W.** *Organismic Theories of the State.* Pp. 209. New York: Longmans, Green & Co., 1910.

**Dawbarn, C. Y. C.** *The Social Contract*. Pp. xii, 152. Price, \$1.25. New York: Longmans, Green & Co., 1910.

At first glance, this supplementary monograph to an earlier work by the same author seems to be but an exhaustive, theoretical treatise on taxation in England. But Mr. Dawbarn is an extreme individualist, and the subject of taxation becomes secondary to his views on individualism as a basis of liberty. He employs both the inductive and deductive methods in order to lay bare the essential bases of his philosophy. He lays stress on the footnote method of illustration to reinforce his theory, which has the advantage of keeping his theory at all times uppermost, but also has the disadvantage of nullifying the importance of his views on taxation which seem to be subservient to his main thesis. His views, however, are clear cut, and his arguments deserve thought and discussion. Though probably unavailable as a text-book, it is valuable as a theoretical side-light on economic and financial conditions.

**Dean, D., and Draper, A. S.,** *The Worker and the State*. Pp. xix, 355. Price, \$1.20. New York: Century Company, 1910.

The authors of the present work, while engaged primarily in education, have secured a remarkably accurate mastery of the peculiar economic problems of the present era which enables them to begin their study of applied education with the very reasonable question, "What are the educational needs of modern society?" As students of modern economic facts, their answer is, "The needs are primarily economic." In other words, no satisfactory curriculum can be constructed apart from an intimate knowledge of the economic facts of present-day society.

As economic evolution has eliminated the old type of apprenticeship, and replaced the economic unity of the home by the economic unity of the factory, the basis for an educational system must be laid on the products of economic evolution, namely, a specialized factory system. So the author has discussed the educational significance of modern industry; the changes in the status of women, including a statement of their former economic position in the home, and their new economic position in industry; the lack of adequate education during the years from twelve to sixteen, which are so often described as "waste years," so far as education is concerned; and the new concept, expressed in trade schools, manual training schools, continuation schools, and other like institutions, of the social value of a form of applied education, which, holding the children in the school, will, at the same time, bring them into intimate contact with the problems of life.

**De Windt, H.** *Finland As It Is*. Pp. xi, 316. Price, \$1.50. New York: E. P. Dutton & Co., 1910.

**Dorr, R. C.** *What Eight Million Women Want*. Pp. xii, 339. Price, \$2.00. Boston: Small, Maynard & Co., 1910.

Eight million women want an opportunity for expression and development. The last generation has witnessed a revolution in woman's social position.



From an individualized unit, drudging in the home, or toyed with at will by a masculine care-taker, woman, through organization, has specialized her activities and risen to a position of real importance in the community. The common law placed serious obstacles in the way of feminine progress, but at the present time the organizations of women have secured or are securing readjustments of the old legal provisions which make women freer and place them in a more equitable position in their relations with men.

The author devotes two interesting chapters to the problem of working girl recreation. In the course of these chapters she points out most effectively the practical barriers which are erected against normal recreation for working girls, details the bitter results of improper recreation facilities, and suggests that the cities provide proper recreation facilities for young girls.

The book is a strong personal appeal, being the opinion of an individual investigator rather than a scientific statement of fact. It is perhaps to be regretted that the author has not come out more boldly and plainly in discussing some of the social problems. The book, nevertheless, represents a distinct contribution to the subject of woman's position in modern society.

**Ford, H. J.** *The Cost of Our National Government.* Pp. xv, 147. Price, \$1.50. New York: Columbia University Press, 1910.

To those interested in the finances of the United States government, this volume is illuminating. Being originally separate lectures delivered by the author in 1909, it is not surprising that one finds a timeliness of data. The subject is presented in a logical way and in a manner that shows a deep knowledge of present conditions. The title itself is significant. Following the exposition on budget making where one is brought face to face with recent incidents occurring in our national legislature in regard to financial matters, we are asked to compare our own country with other civilized nations in the matter of expenditures, both per capita and in the aggregate, and the conclusion is drawn that national cost increases by a transfer of social costs from those that are private to those that are public.

The American system of government is discussed from the standpoint of its evolution and transmission to present conditions, and the conclusion is reached that our constitutional separation of powers is disadvantageous from an economic standpoint, in that it allows for the growth of economic parties or interests. Patronage in its relation to expenditures is treated without gloves as also are the tendencies to swell appropriations by extraneous amendments to financial bills. In concluding the volume a very pertinent though short discussion as to the possibilities of improvement is added which shows some of the defects due to our separation of powers but fails to cite any remedy except a general one—the union of these powers. As a whole the book is suggestive and at the same time well worth the close reading of every intelligent citizen and taxpayer.

**Gettell, R. G.** *Introduction to Political Science.* Pp. xx, 421. Price, \$2.00. Boston: Ginn & Co., 1910.

**Ghent, W. J.** *Socialism and Success.* Pp. 252. Price, \$1.00. New York: John Lane Company, 1910.

These might be designated as a series of open letters to the following groups of persons, the seekers of success, reformers, retainers, certain socialists, trade unionists and doubters of the possibility of the state directing industry. The author is a well-known socialist and his messages which are well described as "uninvited" are for propagandist purposes. Their style is personal; their spirit that of a challenge to debate. Through them all runs an apparently open mind. This is notably true in the criticism offered of those socialists who are intolerant or suspicious of the so-called "intellectuals" within their ranks. This criticism is kindly and apparently well founded. The book is valuable in portraying the spirit of socialism. It is not a theoretic analysis of the economic principles, supposedly underlying the movement.

**Gillette, K. C.** *World Corporation.* Pp. 240. Price, \$1.00. Boston: New England News Company, 1910.

*A Guide to Reading in Social Ethics and Allied Subjects.* By Teachers in Harvard University. Pp. x, 265. Cambridge: Harvard University, 1910.

This is a guide to reading in social ethics, economics, sociology and political science, giving lists of books and articles selected in each of these fields, and described for the use of the general reader. The work is well done, each subject being covered by a specialist in the field now teaching at Harvard. The brief comments about the nature and relative value of the references are particularly to be commended.

**Guyot, Y.** *Socialistic Fallacies.* Pp. xxiii, 343. Price, \$1.50. New York: Macmillan Company, 1910.

This is an attempt to show the inherent weakness of all reforms past and present that savor of the socialistic. The field is covered in nine divisions the first of which is "Utopias and Communistic Experiments." In this Plato's Republic, More's Utopia and the work of such men as Robert Owen and Fourier are briefly discussed. The last division of the work is on "Socialism and Democracy." In this, present conditions are discussed. The weaknesses of the book are its partisan character and its attempt to cover too much ground. The statement, page 173, "Mr. Schwab, who was a director of the United States Steel Corporation, and began life as a workman, has proved by a force of example that capitalism is accessible to all," is one hardly worthy a place in a serious attempt to explode socialistic fallacies. Moreover, when we read the following argument, page 197, "*so far from establishments, which existed in 1850, having monopolized production, they have stimulated competition*, since we find a greater number of establishments in 1900 than in 1850," we are led to question the value of the author's appreciation of American conditions. There is doubtless a field for a book which meets the socialist, argument for argument, but this will not necessitate a defense of

the entire existing order of things which too often seems to be the case with the book in question.

**Hall, C. H.** (Editor). *Narratives of Early Maryland, 1633-1684*. Pp. ix, 460. Price, \$3.00. New York: Charles Scribner's Sons, 1910.

This volume is one of the series of "Original Narratives of Early American History" being published under the general editorship of Professor J. Franklin Jameson. Each of the sixteen sections of the book is prefaced by a brief introduction by the editor, Mr. Hall, who gives a few facts regarding the origin of each paper that is reproduced, and tells something of the author of each document. The value of the volume to most students would have been greater had Mr. Hall included in these "introductions" a brief historical sketch of the events or the period considered in the several original documents. In part, Mr. Hall has done this, but the original papers would have been more instructive if their historical setting had been more clearly indicated. This is, however, a criticism of minor importance. The documents are well selected, and carefully reproduced and the volume makes a most useful addition to the available materials for the first-hand study of colonial history. Several of the originals of the papers contained in the book are so rare and inaccessible as to be practically non-existent even for the investigator.

**Herbert, S.** *The First Principles of Heredity*. Pp. viii, 199. Price, \$1.75. New York: Macmillan Company, 1910.

After a very brief introduction calling attention to the importance of heredity to human society, the author devotes a chapter to "Reproduction," in which he tells how all forms of life replace themselves. A second chapter is devoted to "Germ Cells;" the two following ones to "Theories of Heredity;" with a third on "The Inheritance of Acquired Characters" (which should be called the Non-Inheritance). "The Inheritance of Disease," "Mendelism," and "Biometrics" are the titles of the remaining three chapters.

The book is historical and descriptive with no pretence of offering new material. It is designed for beginners who wish to have the facts available. In this respect the author has been most successful—he gives the facts. To condense so much however in so few pages leaves little meat on the bones. The closest of attention will be required on the part of the reader not well versed in biology, in spite of the effort to avoid confusion. This difficulty aside, the volume is a very clear and compact presentation of the subject and will be found a valuable reference book. It is well illustrated.

**Judson, Katharine B.** *Myths and Legends of the Pacific Northwest*. Pp. xvi, 129. Price, \$1.50. Chicago: A. C. McClurg & Co., 1910.

This is a collection of brief Indian stories concerning the creation, origin of species, theft of fire, and the cunning animal god, the coyote. They are especially linked with the physical features of the country to which they belong, such as the Columbia river, Takhoma, Shasta and other mountains. In them there is little idea of a beneficent diety similar to that obtaining among the eastern Indians.

The volume is not intended to be scientific, but the author vouches for the authenticity of the stories. Some are almost literal translations from the Indian as recorded by government ethnologists. They are told as the Indians would tell them with a simple directness and a certain degree of crudeness. The book is beautifully illustrated by numerous photographs of Indians and picturesque scenes of the Northwest.

**MacCunn, J.** *Six Radical Thinkers.* Pp. 268. Price, \$1.00. New York: Longmans, Green & Co., 1910.

**Mahan, A. T.** *The Interest of America in International Conditions.* Pp. 212. Price, \$1.50. Boston: Little, Brown & Co., 1910.

In this little book the author of "The Influence of Sea Power Upon History," gives a very succinct and comprehensive survey of the world politics of the present hour. As we read, we picture the mighty navies of England and Germany preparing for the possible conflict. It is remarkable how in a few lines, Captain Mahan has been able to embrace the main features of the policies of the Great Powers. A note of distrust of Germany pervades the whole work. In spite of the title, the situation of America is subordinated to the portrayal of the world as divided into two camps: England and her allies, against Germany and her allies. Even in the closing chapter, which deals with the relations between Japan and the United States, the reader is shown how the relations of England and Germany have necessitated the withdrawal of their fleets to leave with the United States the defense of the "Open Door" in the Orient.

**Mangold, G. B.** *Child Problems.* Pp. xv, 381. Price, \$1.25. New York: Macmillan Company, 1910.

**McCrea, R. C.** *The Humane Movement.* Pp. vii, 444. Price, \$2.00. New York: Columbia University Press, 1910.

This report deals principally with the work of the prevention of cruelty to animals, although one chapter handles the problem of cruelty to children. The history of the Humane Movement is carefully traced from the time of its origin in England in 1824 down through its expansion and development in the United States until the present time. Among the subjects covered are the nature and forms of the legislation against cruelty such as laws governing the fighting of animals, vivisection, poisoning animals, trapping, etc. The practical activities of the humane societies are briefly outlined. Included among their work is the prevention of cruelty, the training of individuals in increased humaneness and the promotion of legislation which will reduce suffering. Attention is also given to the anti-vivisectionists and to the Audubon movement. The chapter on children is largely a comparison of the work and ideals of the New York, Massachusetts and Pennsylvania societies.

The very valuable appendices comprise nearly two-thirds of the book. They contain an extensive bibliography on various aspects of the subject, a summary of state laws for animal protection, a directory of the machinery of enforcement, educational pamphlets and other interesting information



relating to humane societies. The appendix serves as a most useful compendium for all persons desirous of advancing the humane movement. Excepting the chapter on children, which should have been treated more adequately or not at all in a book of this kind, the discussion of the subject is very complete and satisfactory.

**Murray, W. S.** *The Making of the Balkan States.* Pp. 199. New York: Longmans, Green & Co., 1910.

**North, S. N. D.** (Editor). *The American Year Book—A Record of Events and Progress, 1910.* Pp. xx, 867. New York: D. Appleton & Co., 1911.

This publication is the first volume in what is expected to be an annual series. It was projected early in 1910 by a group of men who believed that such a work was needed, and that it could best be carried out by the co-operation of the national learned and technical societies. Regularly designated representatives or members of thirty-two such societies have taken part in the preparation of this volume, either by their own contributions, or by suggesting writers, or by supervising the work of such writers. It is intended to be the work of a body of experts, each reviewing the field with which he is most familiar.

The work is intended for the needs of writers and searchers of every kind. Because of its inclusion of scientific subjects, it has been necessary to limit the statistical material; the book does not indicate everything that could be useful, but is a selection from the enormous mass of details of those things which, in the judgment of experts in that field, are most significant, most permanent in value, most likely to answer the searchers' questions.

**Perry, C. A.** *Wider Use of the School Plant.* Pp. xiv, 423. Price, \$1.25. New York: Charities Publication Committee, 1910.

The wisdom of utilizing invested capital is every day more apparent, and nowhere more imperative than in the school system. Nearly half a billion dollars have been invested in the school plant of the United States, yet the greater portion of this plant is utilized less than forty per cent of the time. No more serious charge can be laid against the schools than their failure to make the most of the social investments in school administrative machinery. The author, therefore, suggests that the school buildings be used for evening schools, vacation schools, playgrounds, public lectures, evening recreation centers, athletics, dancing and for any other purpose that will increase the value of the school plant to the community. The book contains an able delineation of one effective means of social advance.

**Ries, H.** *Economic Geology.* Pp. xxxi, 589. Price, \$3.50. New York: Macmillan Company, 1910.

**Spedden, E. R.** *The Trade Union Label.* Pp. xix, 100. Baltimore, Johns Hopkins Press, 1910.

This monograph is "one of a series of investigations into various phases of American trade unionism undertaken by the economic seminary of the Johns



Hopkins University." It presents in compact form the history of the trade union label from its earliest inception and use. The form of the label, its administration and financing, as well as its use and trade jurisdiction, are in turn treated and developed. The legal protection of the label is one of the most interesting chapters in the book. In most cases the authorities are given in the form of footnotes, and no bibliography is appended.

**Taylor, G. R. S.,** *Leaders of Socialism, Past and Present.* Pp. 125. New York: Duffield & Co., 1910.

A leader, says the author, is a "bobbing cork in the river of history," who summarizes and expresses the thought of his time. Proceeding on this hypothesis, a group of essays is presented dealing with the socialist leaders of the past two centuries, but laying particular emphasis on those of the late nineteenth century. The essays are light, interesting and instructive, and are appreciations rather than criticisms. They give an excellent general idea of the viewpoint of the leaders without going into great detail regarding their individual lives.

**Treat, P. J.** *The National Land System, 1785-1820, and the Westward Movement.* Pp. xii, 426. Price, \$2.50. New York: E. B. Treat & Co., 1910.

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REVIEWS

**Bernstein, Edward.** *Evolutionary Socialism.* Pp. xxiii, 224. Price, \$1.00. New York: B. W. Huebsch, 1909.

This volume is undoubtedly the most noteworthy contribution to socialist literature within the past decade. So widespread has been its influence that it is now looked upon as constituting the "Bible" of the revisionist wing of the socialists' following throughout the world.

The author severely yet fairly criticizes the leading tenets of the Marxian philosophy and shows that revision or rejection is necessary. He declares that the materialistic conception of history with its accompanying doctrine of the class struggle is untenable so long as it is allowed to stand as originally formulated by Marx and Engels; that the labor theory of value and its corollary, the theory of surplus value, are but speculative formulae, purely abstract concepts; that the catastrophic theory of a social revolution as well as the theory of increasing misery have "now been given up nearly everywhere;" and that the Marxian idea of an ever-increasing concentration of industry, a prerequisite for the coming of socialism, has not been and cannot be substantiated by the facts at hand.

In advancing a positive program for the socialist movement of the immediate future he lays great stress upon (1) the necessity of the further adoption of certain fundamental democratic principles of government; (2) the passage of various legislative measures for the protection and relief of the working class, and (3) the economic capacities and possibilities of co-operative associations.

Bernstein's criticism of the Marxian theories of value and of surplus value is not as thorough nor as convincing as that of Böhm Bawerk in his admirable volume, "Karl Marx and the Close of His System." His statement of the abandonment of the catastrophic and the increasing misery theories will be universally accepted by all impartial students of the socialist movement who will also agree with him in his declaration that a modification of the materialistic conception of history is necessary. Although Bernstein's figures show that there has not been a noticeable tendency towards the concentration of industry in Germany, it is doubtful whether such an investigation in other countries, especially in the United States, would reveal a similar state of affairs. But even though such a tendency were shown to exist it is the opinion of many that it would not necessarily signify the approach of a socialistic form of society. Finally, his advocacy of the almost unlimited possibilities of co-operative enterprises will fall upon deaf ears here in the United States where co-operation in every form has consistently proved to be a failure, although in European countries it will undoubtedly receive hearty endorsement.

IRA B. CROSS,

*Stanford University.*

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**Black, H. C.** *Handbook of American Constitutional Law.* Pp. xxvii, 868. St. Paul: West Publishing Company, 1910.

The development of national life is reflected in its laws. It is natural therefore that there have come into our statute books in the twelve years which separate this from the second edition of Mr. Black's work a multitude of new laws which the courts have been called upon to construe. The increasing complexity of our social and industrial life, the development of new forms of business organization extending their operation over the whole national domain and even beyond, the increase in the agencies of government intended to give proper control to the new combinations and to increase the power of the government both at home and abroad have brought forth a harvest of statutes which in size and interest dwarfs that of any similar previous period. As a result the old legal principles have had to be stretched to meet new conditions, and we have a conspicuous example of the judicial expansion of a rigid constitution to meet exigencies never dreamed of by its framers.

The new edition emphasizes the decisions dealing with the delegation of authority to commissions and administrative officers, the attempts to encroach upon the so-called sphere of individual liberty through a broad interpretation of the police power, the restriction of freedom of trade and commerce, the increasing control of public service corporations and the highly interesting questions raised by our over-sea possessions. The discussion has been enlarged without destroying the proportion and conciseness which have made this work one of the most available for use as a college text and as a general reference work for the average reader. The best available authorities are cited and the revision has evidently been thorough

on all lines. In its new form the book will doubtless find an increasing sphere of usefulness.

CHESTER LLOYD JONES.

*University of Wisconsin.*

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Brace, H. H. *Gold Production and Future Prices*. Pp. viii, 145. Price, \$1.50. New York: Bankers Publishing Company, 1910.

The author of this monograph has given his readers a brief, logical and interesting analysis of his subject. The first third of the book is devoted to a history of prices and the production of precious metals. This part of the work concludes with a description of modern processes in which gold production has been cheapened to an extent that is startling in its possible significance. The second part of the book gives a lucid discussion of the relation of demand and supply, reaching the conclusion that the value of gold is declining. The author explains that the effects of cheaper gold are not evenly distributed among commodities. He takes issue with writers who hold that price movements cannot be attributed to changes in the value of the standard unless prices of all commodities move together, showing that this view assumes an impossible uniformity in all other price-making factors.

To this point the work may be regarded as a restatement of accepted economic facts and theory. The rest of the book, however, deals with "influences which tend to augment the effects of increased gold production" and "counteracting influences." Among the augmenting influences are (1) the extension of credit as a substitute for gold; (2) a decline in the use of gold for display among most advanced nations. Among the counteracting influences are (1) the increased facility in producing commodities; (2) diminishing ratio of new gold supplies to total stock; (3) the increased demand for gold which comes from a higher level of prices; (4) the elimination of other standards of value. The law of diminishing returns is mentioned as affording a natural check to mining operations. This, however, is a sword which cuts both ways, operating upon many commodities as well as upon gold. In view of the modern improvements in gold production, the effect of diminishing returns in that field may be for a long time postponed.

Mr. Brace seems not to be deeply concerned with the academic question whether it is the greater supply of gold or the lower cost of producing gold which makes it cheaper. In the introduction he says, "The most effective of the general influences which underlie the great swells of price movements is the cost of producing gold as compared with the cost of producing all other commodities," but on page 142 we read, "Gold is often a by-product and this tends to make it independent of its own cost of production. Then there is a thirst for gold which causes men to search for it and mine it with such eagerness that the cost, all things considered, is greater than the selling price." Throughout the discussion the implication seems to be that supply rather than cost is the fact to be reckoned with.

MURRAY S. WILDMAN.

*Northwestern University.*

**Brooks, R. C.** *Corruption in American Politics and Life.* Pp. xv, 309.

Price, \$1.25. New York: Dodd, Mead & Co., 1910.

We so often think of corruption as a feature of "practical politics" that we forget that it is a much broader phenomenon. Political corruption is only a symptom of a condition far too prevalent in all branches of our national life. The author aims to analyze the nature of these conditions and to show the far-reaching character of the task which thorough-going reformers must set themselves.

The first two chapters of the work, *Apologies for Political Corruption* and *the Nature of Political Corruption* have already become known to those interested in political science through magazine publication. After the definition of the field of the work in these two preliminary studies there follows an analysis of the reasons why corruption is so persistent a by-product of political and social life. A brief review of the history of corruption from the Greeks to Pepys, Tweed and our present-day offenders shows that, though the evil is still with us, its forms have become less and less dangerous. In spite of the fact that the methods of the modern corruptionist often show skill little short of genius, Mr. Brooks believes that the evil is gradually being driven into fields less profitable to exploit. Not even Chris. Magee, former boss of Pittsburgh, could now declare that a "ring could be made as safe as a bank," and it cannot be said that "the people will never kick on a ten per cent rake-off." National, state and municipal governments represent decreasing grades of success in the fight for clean government, but in every branch conditions are, on the average, far better than a generation ago.

A chapter on corruption in the professions brings out strong contrasts, especially in the opinions as to the effect of money influence on the press and on educational institutions through acceptance of "tainted money." Mr. Brooks concludes that no great danger threatens from this quarter since the improper use of money in the professions must destroy the people's confidence in those influenced and hence bring the defeat of its own ends. The most insidious forms of corruptions, and those which do most to debauch public opinion are those which appear in the world of business. Such abuses tend to leave the economic field and become a menace to the state itself. Government regulation, though its mistakes be frequent, must be our reliance here to an ever greater extent, and the government servants must be kept from forsaking the service for that of the great business organizations by adequate salaries and a general recognition of their service to the public.

Finally, how shall political corruption itself be kept down? Here, too, the machinery of the state must be called upon to regulate who may make contribution for political purposes, how much may be contributed and how the money may be spent. Other forms of corrupt reward, such as those connected with the patronage must be uprooted by an efficient civil service system supplemented by civil pensions.

A detailed exposition of the subject treated can not be expected in a book of this size. In fact that is the greatest criticism of the discussion—



that there is not more of it, but no one will read its pages without getting a clearer idea of what clean government means.

CHESTER LLOYD JONES.

*University of Wisconsin.*

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**Bruce, P. A.** *Institutional History of Virginia in the Seventeenth Century.*

Two vols. Pp. xix, 1404. Price, \$6.00 New York: G. P. Putnam's Sons, 1910.

It is impossible in a review, a few hundred words in length, to criticize in detail a work such as Dr. Bruce has written upon the early institutional history of Virginia. Like his previous volumes upon the economic and the social aspects of Virginia in the seventeenth century, this account of the "inquiry into the religious, moral, educational, legal, military and political condition of the people" of the colony is not only "based upon original and contemporary records," but is presented with such wealth of detail and illustration as to command the admiration of every special student of early colonial history. All three of Dr. Bruce's works appeal rather to the historian than to the lay reader of history.

Volume one of the Institutional History contains three parts, dealing severally with religion and morals, education, and legal administration. The evidence presented by Dr. Bruce shows more zealous observance of religion and higher public standards of morality than have generally been attributed to the Virginians of the seventeenth century; but the evidence presented seems to justify the author's favorable judgment. Likewise, the attention given to education is shown to have been general and persistent; and the planting class, as shown by "the surviving letters of the foremost Virginians of the seventeenth century," contained many men of culture. The development of the administration of justice in the county and general courts is admirably presented, a third of the first volume being devoted to that subject.

The second volume is concerned with the military system and political condition of the colony, one-third of the space being given to the former subject and two-thirds to the latter. The forty-two chapters, dealing with the political affairs of Virginia, the executive and legislative machinery of government, and the methods of taxation, make a most notable contribution to the subject. In this part of the work, the author is at his best. Among the minor features of volume two, mention may well be made of the two chapters upon pirates. During the two decades of the seventeenth century, piratical raids were of frequent occurrence, and were a constant menace to the plantations along the coast.

Doctor Bruce is to be congratulated upon having brought to a successful end the task he set himself some twenty years ago of presenting "a complete picture of all the conditions prevailing in Virginia previous to 1700." The accomplishment of his purpose has required a vast amount of labor, all of which has been performed with most conscientious accuracy and fairness.

EMORY R. JOHNSON.



*The Catholic Encyclopaedia*. Vol. VIII. Pp. xv, 800. Price, \$6.00. New York: Robert Appleton Company, 1910.

The new volumes of this important reference work upon all subjects pertaining to Catholicism are appearing with gratifying regularity. The eighth, dealing with topics from Infamy to Lapparent inclusive, maintains the high standard of the earlier ones referred to in these reviews, *THE ANNALS*, Vol. XXXV, Pp. 738-740. Among the articles of especial historical interest in the present one may be mentioned the biographies of the various popes named Innocent, the discussions under Inquisition, Investiture and *Kulturkampf*, and the articles dealing with Ireland, Italy and Japan, in which the civilization and religious conditions receive full treatment. The statistics given in connection with these latter articles are of much interest and value, especially those giving the distribution of the Irish in various lands and the numbers and condition of the Italians in America. The subjects of Interest, Labour and Land Tenure are of value to the economist, though the treatment of the first of these is brief and unsatisfactory so far as it relates to the Church's prohibition of all exaction of interest on loans during the Middle Ages and even in later times. We are, however, promised a fuller treatment of this in a future volume, under Usury. To many, the articles on various books of the Bible will appeal as showing the attitude of Catholic scholars on matters of higher criticism. As an illustration of the candor with which some of these articles have been prepared may be cited the one on I and II Kings, where the author, though rejecting the views of those critics who deny the complete historicity of these books, yet states his adversaries' conclusions so fairly that the thoughtful reader is as likely to agree with the critics as to accept the refutation of their views given in the article.

A. C. HOWLAND.

*University of Pennsylvania.*

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**Coman, Katharine.** *The Industrial History of the United States*. Pp. xvii, 461. Price, \$1.60. New York: Macmillan Company, 1910.

This is a new and revised edition of a work first issued in 1905. Besides considerable remodeling of the first edition by the omission, transfer, and addition of paragraphs and sections, the present edition has been augmented by the expansion of one of the former chapters into two, and, to quote the author, "a final chapter on the conservation of our national resources has been added to this edition in the hope of making evident the transcendent importance of the interests involved." For the assistance of teachers, suggestions for supplementary reading and for class discussion are given in an appendix.

The revision of this text will undoubtedly add to its popularity and value. The tendency in modern thought to separate "agriculture" from "industry" has been wisely neglected by the author, and while one would naturally not expect to find the former considered in a volume with the present title, it is a pleasure to find that agriculture is not only given a place in "industry," but its history and importance to economic life are

justly emphasized. Hence, in a measure, the final chapter on "Conservation," admirably sums up the present status of the problem relating to our natural resources of every kind which have been exploited in the past with such thoughtless prodigality. There is scarcely a problem considered in this final chapter the history of which cannot be traced more or less clearly throughout the volume, and particularly those relating to our agricultural resources.

While, therefore, the text has been improved by revision for the use of teachers and students, it is equally valuable to the industrial worker, the agriculturist, and the general reader. It places concisely before the reader the many economic and social problems which our industrial history has bequeathed to the present and future generations for their solution.

JAMES B. MORMAN.

*Department of Agriculture, Washington, D. C.*

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**Curwood, J. O.** *The Great Lakes.* Pp. xvi, 227. Price, \$3.50. New York: G. P. Putnam's Sons, 1909.

Among the "American Waterways" none have played a greater part in the history and development of the country than have the Great Lakes. In the wanderings of early explorers and pioneers, in the struggle for possession of the territory about their shores, and in the tremendous growth of inland commerce, these lakes have attained great prominence. Each of these phases of lake history is a fascinating story in itself; all three are covered in this volume.

The first part of the book is devoted to the lakes of the present day, especially from the standpoint of their shipping and commerce: the ships themselves; the lake traffic, with chief commodities and shipping points. For anyone who has never been in the lake region, this part of the volume reads like a novel. Few among those familiar with lake activities will fail to find here a word picture making vivid a magnitude of operations only half realized before.

There are, however, occasional questions of fact with which the reviewer takes issue, as for example, the statement that a ship yard in Detroit employing 3,000 men is "the largest in America," and the placing of the available ore supply of the Lake Superior region more than a billion tons too low. In the light of all the evidence at hand it is extremely questionable whether "hundreds of millions of bushels of wheat raised in the Canadian west" will move over the lake route. It is hard to agree with the author's opinion that the vast iron and steel industries of Pittsburgh will move to Buffalo and that the latter city is destined to become the greatest manufacturing city in North America. Why, in discussing the great prospects of Buffalo and Duluth in the future steel industry, Gary, Indiana, gets no mention at all, even as a possible rival, is difficult to explain. Finally, the assertion that Duluth and Superior "will head the ports of the world probably for all time to come," is as absurd as to say that Duluth is to become a great manufacturing center because the St. Louis Falls offer electrical power

"second only to that of Niagara." As a matter of fact, all the streams tributary to Lake Superior in this country offer less than 250,000 available horse-power at the maximum estimate. In some of these respects the taint of boom spirit mars the book for the critical reader, and is likely to make any thoughtful reader look somewhat suspiciously at other large statements. With the chapter on Buffalo and Duluth brought down to solid earth, there could be nothing but praise for this first part as a whole.

The last part of the book deals historically with the lakes, covering their relations to various important chapters in our history. From cover to cover the book is most readable. In addition it is beautifully illustrated.

WALTER S. TOWER.

*University of Pennsylvania.*

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**Ellwood, C. A.** *Sociology and Modern Social Problems.* Pp. 331. New York: American Book Company, 1910.

A society is defined as a group of individuals who have conscious relations with each other. Sociology is said to be the science which deals with human association, its origin, development, forms and functions, and its field is defined in contrast with biology, psychology, history, economics, politics, ethics and education.

Human society as now known has evolved from other forms, and hence the discussion of theories of descent and factors in organic evolution. The family is selected as the best social institution for detailed study, because it is most fundamental and is the best point of view for discovering the beginnings of all other sanctioned groupings and relations of society. There are great advantages in introducing a young student to the subject in this way. Scientific study is the description, explanation and interpretation of phenomena, and in the case of the domestic relations the young person already has in memory a considerable number of facts derived from direct observation and experience, and so can proceed from the best known to the less known and so on to the unknown without breaking continuity of mental processes. The family is so organized in relation to industry, property, state, school, church, that a careful examination of its life activities compels the teacher and pupil to go a certain distance into all these fields of social science.

The social function of the family is to reproduce the species, to transmit material and spiritual possessions, and to promote social progress. The family has its origin in the facts of sex and the care of offspring, and it has passed through various forms whose history is sketched.

The discussion of social problems begins with those of the domestic group, and divorce is selected for special consideration. The transition to growth of population is natural and easy. Since immigration is a source of increase of population in our country its problems are presented, and reasons for restricting or selecting immigrants argued. The negro element in immigration offers particular difficulties and these are taken up. The agglomeration of dense masses of people in cities causes new combinations and gives rise to new perplexities, and these are studied in their bearings on the wel-

fare of the race. Finally, pauperism, crime and socialism are studied, and the supreme importance of education for citizenship in the highest sense is demonstrated.

The book is intended by the author as an elementary text in sociology, especially for university extension courses and teachers' reading circles. It is a sensible, intelligent, interesting and clearly written volume, and well adapted to its purpose.

C. R. HENDERSON.

*University of Chicago.*

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**Foght, H. W.** *The American Rural School.* Pp. xxi, 361. Price, \$1.25. New York: The Macmillan Company, 1910.

"The American Rural School" summarizes contemporary opinion regarding the organization and administration of the rural school, its maintenance, supervision, sanitation, and curriculum; also its architecture, its decoration, and its environments. Particular attention is given to the training of the rural-school teacher, and to the consolidation of rural schools. The history of the rural school is briefly traced, in order that it may be shown what the prevailing tendencies are. It is pointed out that great changes have taken place in American society, so that the city has become a menace to country life. Professor Foght brings out this fact in order to impress his view of the function of the rural school—to make country life attractive, and to give rural boys and girls an understanding of the requirements for a successful and interesting life in the country. The curriculum of the rural school must be determined by the needs of rural life, although Professor Foght says that little attention is paid in the typical country school to matters pertaining to the farm and to home life in the country. He maintains that nature study and industrial work must be given a place coördinate with the study of books. The aim throughout must be to make country life complete, so that the boys and girls will not drift to the city in such large numbers as they are now doing.

In order to meet the requirements for an efficient country school, it is imperative that rural schools should be consolidated. The isolated school with its few pupils, its entire lack of equipment, its unsanitary condition, and its uninviting exterior and interior cannot accomplish effective work. The history of the movement for consolidation is briefly traced, and practicable methods of securing it are presented.

The style of the book is simple, and should be read by rural-school teachers, and all who are interested in the present condition and the improvement of the country school. Many photographs and diagrammatic illustrations are used, and these make the treatment of various topics concrete and interesting.

It should be added, perhaps, that the book does not present any new material. No new points of view are offered, and no contributions are made to the solution of unsolved problems concerning rural education. The book is simply a summary and restatement of the best contemporary views regarding feasible improvements in the rural school.

M. V. O'SHEA.

*University of Wisconsin.*



**Frazer, J. G.** *Totemism and Exogamy*. 4 vols. Pp. xxxiii, 2181. Price \$16.00. New York: Macmillan Company, 1910.

There is to-day a widespread popular interest in the material achievements of other and earlier peoples. Vast collections of weapons, utensils, clothing, sculpture, have been gathered and splendidly housed. The development of man's intellect, his beliefs, explanations, superstitions has, save in a few special groups, received much less attention. This is hardly a compliment to our intelligence, though it may be a tribute to the power of our own beliefs in checking investigation lest we lose some of the reverence for the assumed finality of conventional dogma. Hence it is that men like the author of this great study have received far less attention than they deserve.

The scheme of the present work is as follows: In Volume I there is a reprint of an earlier study long since out of print, "Totemism," first issued in 1887, and two articles from the "Fortnightly Review." The new work begins on page 173, under the title "An Ethnographical Survey of Totemism." Australia is discussed throughout the balance of the first volume. In the second volume, New Guinea, Melanisia, India, Africa, etc., are considered while Volume III is devoted to the Americas. A great mass of valuable evidence is presented.

In Volume IV the evidence given in the earlier volumes is summarized and the conclusions stated. This is followed by nearly one hundred and fifty pages of later notes and corrections, an index and maps of countries considered.

"Totemism is an intimate relation which is supposed to exist between a group of kindred people on the one side and a species of natural or artificial objects on the other side, which objects are called the totems of the human group." It is hard, practically impossible, to explain in detail the relationship, so varying is the interpretation in different groups. Totemism "is a crude superstition, the offspring of undeveloped minds, indefinite, illogical, inconsistent." The relationship is one of "friendship and kinship." The savage considers "the totems" . . . "as his friends and relations, his fathers, his brothers, and so forth." "Totemism is an identification of a man with his totem, whether his totem be an animal, a plant, or what not." Totems are honored but are not worshiped. In origin it is not a system of religion though it may lead to it for we find the religious aspect only among somewhat advanced groups. Among many peoples the totem may never be eaten while among others it is a solemn duty to eat the totem. Probably the latter is the older custom and later the idea that it was better not to kill and eat the totem arose.

In general—there are some marked exceptions—the totemic clan is also exogamous—it must marry outside of itself and into other totems. After long discussion the author concludes that exogamy did not grow out of totemism, but had an independent origin. Later, a fusion has sometimes occurred. The two systems often exist independently, one in one tribe, one in another. Without attempting here to outline the evidence Dr. Frazer finally decided that totemism is really based on man's ignorance of the part played by the male in generation. It is an attempt to explain paternity.



The history of the theories about exogamy is given with special attention to McLennan and Westermarck. The real clue he thinks was suggested by Morgan as a scheme to abolish the marriage of blood relatives. Dr. Frazer feels that this was the origin in Australia as well as in America.

Whether the author has stated the explanation in final terms is relatively unimportant. We cannot know too much of social origins. This is a most valuable discussion. The special student will read it all—the general reader will find the fourth volume sufficient. No reference library can afford to be without these volumes. They represent a great amount of careful study, monumental in character.

CARL KELSEY.

*University of Pennsylvania.*

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Hall, J. P., and Andrews, J. De W. *American Law and Procedure.* 14 vols. Pp. ccxlviii, 5912. Chicago: LaSalle Extension University.

Of the fourteen volumes constituting this monumental work, the first twelve were prepared under the editorial supervision of James Parker Hall, dean of the University of Chicago Law School. The remaining two volumes were written by James DeWitt Andrews, formerly of the Law Faculty of Northwestern University.

The work was designed to give a "brief, but accurate account of the principal doctrines of American law, in such form that they may be readily comprehensible not only to lawyers but to intelligent readers without technical training."

Volume I opens with a short prefatory note, and an interesting introduction. This introduction discusses the meaning, sources and classification of law, and gives, moreover, an outline of English legal history and an explanation of the use of judicial precedents. Volume I also treats of Contracts, Quasi Contracts and Agency. Volume II takes up Torts and Domestic Relations; Volume III, Criminal Law and Procedure and Sales; Volume IV, Personal Property, Bailments, Patents, Copyrights, etc., and Landlord and Tenant; Volume V, Real Property, Mining and Immigration Law; Volume VI, the Law and Practice relating to Wills, Equity and Trusts; Volume VII, Negotiable Instruments, Guaranty and Suretyship, Insurance and Banking; Volume VIII, Partnership, Corporations and Carriers; Volume IX, Public Corporations, Public Officers, Extraordinary Remedies and Conflict of Laws; Volume X, International Law, Damages, Judgments, etc., and Bankruptcy; Volume XI, Evidence, Pleading and Practice and Legal Ethics; and Volume XII, Constitutional Law. Volume XIII consists of a lengthy treatise on Jurisprudence and Legal Institutions. Volume XIV contains an article on Statutory Construction, a Glossary and a copious Index.

From the foregoing is apparent something of the editors' plan of treating the vast field they set out to cover. They are to be commended for paying special heed to the philosophic aspects of legal study. The work is aimed not only to afford information to those seeking it, but also

to present to the student, at least in outline, a plan of the entire system of American law from foundations to roof.

This is professedly the object of Volume XIII. Dr. Andrews insists that law is to be studied not as "a wilderness of special instances" but rather as a science. Therefore, he desires to co-ordinate all the various branches of the law, and have them studied as parts of one harmonious whole. It is to be regretted that this purpose was not kept more prominently before the minds of the editors in arranging the general table of contents. The various articles are as so many separate and independent text-books. The very order in which they appear, as indicated above, shows a lack of proper arrangement. For instance, we find Volume I ending with an article on agency, while Volume II treats of torts and domestic relations, and then in Volume III we have a discussion of criminal law and procedure and sales. Indeed, even the treatise on jurisprudence and legal institutions, which seeks to impart a scientific method to the study of law, is open itself, perhaps, to the charge of not being entirely scientific or methodical. It contains a great many quotations from all manner of writers, and while these quotations are always interesting and often illuminative, they help make Volume XIII somewhat discursive and fragmentary. If the contents of this volume were boiled down and made part of the introduction, the practical value to the beginner of Dr. Andrews' learned disquisition would be far greater.

But the general plan of treating each of the various concrete subjects mentioned above, such as torts and agency, is admirable. Even here, however, there is room for occasional criticism. Thus, for instance, wagers and agreements in restraint of trade are treated under discharge of contracts rather than under formation of contracts, although in both cases the illegality tainting the transaction prevents a contract from ever being formed, so that there is none to be discharged. However, for the most part the arrangement of each subject is excellent, and the table of contents exhibiting it enables the reader to refer promptly to the desired information.

The style of the authors of almost all the articles has been well adapted to the needs of those who will use American Law and Procedure. Legal principles are stated in a plain and business-like way. The text is throughout interesting, and technical expressions are avoided as much as possible, although not at the expense of legal accuracy. Accordingly the books are quite readable. They are not encumbered with a mass of notes, since they have been designed more for students than for active lawyers. Nevertheless, the active practitioner will find much in their pages to repay his careful attention.

Sets of questions are to be found at the end of each volume, which will enable the student's memory and understanding of what he has read to be carefully tested. Another useful feature of the work is the reference to standard text-books and other authorities wherein the subjects covered by the various articles may be found more fully treated. Above all, the correspondence course maintained by the LaSalle Extension University will add vastly to the value of the entire work.

Some of the articles call for special mention by reason of their exceptional excellence. Thus, the treatise on Copyrights and Trademarks, is quite up to date and practical, although for lack of space the trademark laws of the several states could not be set forth. The article on Patent Law is also very good. Dr. Andrews' work on Statutory Construction has great merit, and forms a valuable part of the general scheme of instruction adopted by the editors of *American Law and Procedure*. Special mention may be made also of the work on Constitutional Law by Professor Hall.

Many students will be able to gather more from this work than they could from a much larger and more pretentious one. Its limited size prevents it from being anything like exhaustive. But the very curtailment of the discussion on many topics, which confines the student's attention to basic principles, makes for a clearer understanding of those principles. In the larger digests and encyclopædias which purport to cover the entire field of American law, the beginner's attention is distracted by a multitude of conflicting decisions, and often where there is no conflict, the main outline of the law is lost sight of in a maze of petty details. *American Law and Procedure* will, therefore, find a place in legal literature, and will doubtless prove of great service to lawyers and general readers, as well as to the students for whom it is primarily intended. The fourteen volumes constituting this set of books are well written. The type is large and easily read. The binding is attractive and serviceable.

JOHN J. SULLIVAN.

*Philadelphia.*

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Jenks, J. W. *Governmental Action for Social Welfare*. Pp. xvi, 226. Price, \$1.00. New York: Macmillan Company, 1910.

The chapters that make up this volume were given as the Kennedy Lectures, for 1907-08, in the New York School of Philanthropy. The title, which suggests an examination and exposition of principles underlying social legislation and administration, is a trifle misleading, for the book discusses the practical and personal difficulties that must be recognized and overcome in getting adequate legislation and effective administration.

Beginning with a summary of the handicaps to which social thought and action are subject, and of the prejudices that must be reckoned with in practical relations with men, the chapters take up in succession the problems involved in dealing with the various departments of government. The human element is emphasized throughout. Legislation is ever a matter of compromise. The average legislator is a practical man. He may be aware of the worth of a measure, but is unlikely to urge it unless there is a strong chance of success. He is likely to defer its consideration until a more favorable time, or by piecemeal gains to reach desired ends in the spirit and by the methods of compromise. With this, the social reformer should not be impatient. The reformer is largely a product of his surroundings and experiences. He must remember that those upon whom he depends for governmental action in the interest of social welfare are likewise a

product of the conditions amid which they live. Their conception of social and legislative activity, as well as their methods of work, must ever be viewed in this light. "Those, therefore, who wish to improve the welfare of society must study carefully the conditions of the state at the time of their movement, and must see to it that their reforms are adapted to those conditions."

Such is the vein of thought that runs through the book. The successive chapters are illustrative of its applications in various directions. The main weakness of these discussions is an apparent unwillingness to get down to fundamentals, and an all-sidedness of view that verges perilously on no-sidedness. The main element of strength is the mass of illustration that Professor Jenks' varied experience so richly affords.

ROSWELL C. MCCREA.

*New York City.*

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**Johnston, Henry H.** *The Negro in the New World.* Pp. xxix, 499. Price, \$6.00. New York: Macmillan Company, 1910.

Whatever its merits and defects this volume is the most comprehensive study yet issued on this subject. It is likewise the best illustrated. We often forget that in the two Americas there are upward of 25,000,000 negroes (including descendants of mixed blood), of whom about 10,000,000 are in the United States.

The author is, perhaps the best informed man living as to conditions in Africa, where he has traveled widely and about which he has written many books. It is evident that he has read a wide literature dealing with the history of the transfer to the New World. The present book will be a most convenient source of information to the student wishing to learn of the history of slavery under the various old world nations in so far as their colonies here are concerned. This wide range, with the happy style of the author, and his wise choice of illustrations give great charm and value to the volume. The strength just noted, hints at its weakness—the danger of superficial observation. A knowledge of literature plus a brief journey through the United States hardly qualifies any man to pass adequate—let alone final—judgment on the situation.

Passing in review the physical characteristics of the negroes and the influence of the African environment, the author assigns the negro a place in a sub-order of the human race somewhere between the Australian natives and the whites. However in describing the influence of the African environment the author makes it clear that he is by no means certain how much of the imputed inferiority is due to race, how much to hard conditions of life.

The few pages on America before the negro came, contain a meager account of the Indians, chiefly in South America. This account is so poor that the chapter might have been left out. Then follow in order the description of slavery under the Spaniard, the Portuguese, the Dutch, the French, the British, the Danes, the chapters well illustrated, including good maps.



Beginning on page 353, the balance of the book is devoted to the United States. There is first a rambling account of the introduction and employment of slaves, the rise of the anti-slavery attitude, though the statement that the Quakers "set their faces steadfastly against negro slavery" is hardly accurate. A very good summary is given of the legal developments affecting slavery.

The chapter on slavery in the Southern states sketches the social development with little reference to economic conditions. The author severely criticises the South and wonders that ten thousand men did not follow John Brown instead of a mere handful, and tells how the "haughty South"—"goes about"—"with a twinkle in the eye and an amused glance at the negro institutes and colleges which are rising on every side."

The chapter on education is first devoted to the Hampton Institute, the grounds of which offer an "orderly beauty rarely to be seen in the United States." The author suggests that peacocks are needed. The plantation melodies, however, did not strike a responsive chord in his heart. The religious philosophy taught here and elsewhere is too narrow and some knowledge of "the newer Bible we are just learning to read, the Story of the Earth on which we dwell" is suggested. "The fetish of the Old Testament," the neglect of modern science is deservedly criticised. The effect of Hampton and Tuskegee on the students is highly commended. He speaks of the training in dressmaking at Tuskegee and criticises the color schemes suggested by the teacher as being designed for the color of the whites and ignoring the very different skin tints of the negro.

The beauty of the southern land greatly impressed the writer though he met no negro who seemed to have observed the "*gorgeous landscape beauty*." The author made a brief trip through the negro belts of Alabama, Mississippi and Louisiana. He thinks there is a deliberate tendency to exaggerate assaults on white women. The wanton lynchings by whites impress him as very ominous. He says, and correctly, that the United States needs a rural constabulary.

On the whole the negro is much more a part of the people than are the Chinese. They are better situated than many Europeans. Nowhere else in the world has he taken so great advantage of his opportunities. He suffers now under many handicaps, but the day will come "when the white American meets his brown-skinned brother on equal terms in the mart, the exchange, the university, and the theatre," and if then he comes across "some old book of the early twentieth century" will "smile at the rude diatribes of a Vandaman." Evidently then he hopes for a happier future.

Unfortunately the author shows no familiarity with some of the best current literature which is studious and descriptive rather than controversial. For instance, no mention is made of the work of Alfred Holt Stone or Walter F. Willcox, to mention one Southern and one Northern man. The volume is valuable, however, for its comprehensiveness, its historical review, and the frank expression of the author's impressions.

CARL KELSEY.

*University of Pennsylvania.*



**Palgrave, R. H. I.** (Ed.). *Dictionary of Political Economy*. 3 vols. Pp. lii, 2529. Price, \$15.00. New York: Macmillan Company, 1910.

All three volumes of Palgrave's *Dictionary of Political Economy*, were reprinted, with corrections, in 1910. The changes in the main body of the work have been confined to minor detail without alteration of paragraphing or paging. The dictionary was, however, brought down to date in 1908, by an appendix to volume three which contains brief articles supplementary to the papers contained in the volumes as formerly published, and which discuss topics that have become important during recent years.

The editor says in his introduction to the preface that "At no period of the history of the world has applied science done more to assist industry, to facilitate the means of communication, and to promote the development of business than during recent years." The changes in economic activity and thought, the growth of government regulation of, and interference with, commerce and industry, the establishment and activity of the Hague Tribunal, the progress of labor organization, these and many other questions of first-rate importance are appropriately discussed in the appendix to volume three.

Such a work as Palgrave's *Dictionary of Political Economy*, is an indispensable reference book for all students of economics, American as well as English. It is an essential part of any well-equipped public or private library. However, the work is mainly, though not exclusively, the creation of English scholarship, and the point of view in most parts of the volumes is English. It is probably impossible for an English or German encyclopedia to lay such emphasis upon American topics as to make the treatment entirely satisfactory to American students. Likewise, it is not to be expected that American scholars can produce a work that will meet all the needs of foreign students. Palgrave's volumes are of the highest rank, but there is still need of a similar dictionary by American scholars. A *Cyclopedia of American Government*, is now being written under the general editorship of Professor Albert Bushnell Hart of Harvard University and Professor Andrew C. McLaughlin of the University of Chicago. This American work, together with Palgrave's *Dictionary of Political Economy*, and Conrad's *Handwoerterbuch*, will give students of economics and government comprehensive and authoritative reference works.

EMORY R. JOHNSON.

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**Quaife, Milo M.** (Editor and annotated by). *The Diary of James K. Polk During His Presidency, 1845-1849*. 4 vols. Pp. xxxii, 1962. Price, \$20.00. Chicago: A. C. McClurg & Co., 1910.

The publication of the diary kept by President Polk during the greater part of his administration is a notable event, as it is a historical document of great importance. Probably no other President has been more misunderstood, adversely criticised, and even maligned, than President Polk. To be sure, several historians within recent years, notably the late Professors Bourne and Garrison, as also Dr. Schouler and Professor McMaster, have had access to the diary in its manuscript form and they have done much

to correct that former view of Polk's character which found expression in the name frequently given to him of "Polk, the mendacious." "It is not unlikely, however, that these printed pages," to quote from the opinion expressed by Professor A. C. McLaughlin in his appreciative introduction, "will bring in a new and juster estimate of Polk himself and a fairer view of the four years which, judged by results, are second in importance to few periods in our history."

The diary owed its origin, as Polk records, to "a very important conversation" which took place on August 26, 1845, in a Cabinet meeting, between himself and Buchanan, on the Oregon Question. "This conversation," writes Polk, in the cold matter of fact style, that characterizes all his entries, "was of so important a character that I deemed it proper on the same evening to reduce the substance of it to writing for the purpose of retaining it more distinctly in my memory. . . . It was this circumstance which first suggested to me the idea, if not the necessity of keeping a journal or diary of events and transactions which might occur during my Presidency" (II, 101). From this time on throughout the remainder of his administration and, indeed, until June 2, 1849, only two weeks before his death, he with great fidelity and conscientiousness adhered to his resolve and chronicled the events of the day, oftentimes at considerable inconvenience. There is no evidence that Polk kept the diary with any expectation of its future publication, although there are here and there indications that he may have had in mind the possibility of making use of it in the preparation of an autobiography, or historical review of his administration. Thus he writes on one occasion, "If God grants me length of days and health, I will, after the expiration of my term, give a history of the selfish and corrupt considerations which influence the course of public men, as a legacy to posterity" (II, 329). His early death prevented any such intentions from being carried out, if they were seriously entertained. Mrs. Polk, however, desired some friend of her husband to make use of this voluminous record and other papers, to prepare a history of Polk's administration, but her wishes were not carried out. In 1901 the Chicago Historical Society purchased the manuscript of the diary, which up to that time had been in the possession of the Polk family, and it is due to this Society that the diary is now presented to the public more than sixty years after the events that it records occurred.

No other President, save John Quincy Adams, has left so full and minute a record of his administration. In its pages are presented with great fulness the proceedings of the Cabinet. In the most direct and matter of fact way Polk records the views he had expressed on all the important questions of the day, such as the annexation of Texas, the settlement of the Oregon boundary, the war with Mexico and the resulting acquisition of California and the great Southwest, the struggle over slavery in the territories which, with the introduction of the Wilmot Proviso, entered upon a new and more acute stage. Many of these entries throw such new light on the views of Polk that they will correct many misconceptions, and will necessitate a reconsideration of the judgments that had been passed upon

his acts. As Professor McLaughlin declares, "We are likely to form a more charitable estimate of his dealing with Mexico and England, and to acquit him of any pusillanimous bluster and surrender to England while engaged in imperiously giving intentional affront to Mexico" (I, xiv). The diary shows that in the case of Oregon he stood out courageously in the face of the opposition of Buchanan, his Secretary of State, and the southern wing of his party, for a firm policy towards Great Britain even at the risk of war. Although he did not secure the extreme demands of the democratic platform, he forced Great Britain to offer the very terms that she had previously rejected. Again these pages show that while Polk was an expansionist and desired to extend the boundaries of the United States to the southwest, they acquit him of the charge that he made war on Mexico in the interests of slavery extension. Later he even successfully opposed the proposal for the annexation of "all of Mexico" against a strong section of his party.

That he was a nationalist is apparent from numerous comments on the slavery question. Not only did he condemn the Wilmot Proviso as "mischievous and wicked," but on the other hand he was equally emphatic in his condemnation of the course of Calhoun and the Southern members of Congress. He writes "I feared that there were a few Southern men who had become so excited that they were indifferent to the preservation of the Union. I stated that I put my face alike against Southern agitators & Northern fanatics & should do everything in my power to allay excitement by adjusting the question of slavery and preserving the Union" (IV, 299).

No civil service reformer could be more severe in his condemnation of the professional office seeker than Polk. His diary fairly bristles with the invectives he hurls against the "herd of lazy loafers" and "patriots" who continually harassed him during the whole of his administration. From the numerous quotable passages relating to this subject, the following must suffice: "The people of the U. S. have no idea of the extent to which the President's time, which ought to be devoted to more important matters, is occupied by the voracious and often unprincipled persons who seek office. . . . It requires great patience & full command to repress the loathing I feel towards a hungry crowd of office hunters who often crowd my office" (III, 419). Repeatedly, he declares, "I most sincerely wish that I had no offices to bestow" (I, 261, 446; II, 105).

Polk committed to the confidence of his diary the most unsparing criticism of his contemporaries. He draws a most unpleasant portrait of Buchanan. While recognizing his ability, he regarded him as selfish, insincere, inconsistent and capricious. He was the one member of his Cabinet that caused him the greatest embarrassment. "All his acts and opinions," he writes, "seem to have been controlled with a view to his own advancement, so much so that I can have no confidence or reliance in any advice that he may give upon public questions" (III, 403). Of Calhoun's character also he formed a very poor opinion, believing that he "had become perfectly desperate in his aspirations to the Presidency, and had seized upon the sec-

tional question as the only means of sustaining himself in his present fallen condition. . . . He is wholly selfish & I am satisfied has no patriotism" (II, 457-9). From passages of similar frankness, we gain not only Polk's estimate of the character and purposes of his associates, but also a conviction of his own love of the Union and his condemnation of self-seeking and partnership that placed devotion to party above principle.

Indeed, not only does the diary present Polk in a new light as a statesman, but it also increases our respect for him as a man. Although he appears narrow, cold some times, indeed, prejudiced and inclined to place a low estimate upon the motives of men in general, nevertheless he is revealed as possessing a large measure of good judgment, decision, firmness and courage, as well as directness and perseverance, a man of force, who dominated his Cabinet and successfully carried to conclusion all of the measures he had determined upon at the opening of his administration.

The editor has taken few liberties with the text, beyond leaving out repetitions, supplying in brackets obvious omissions, and modernizing the punctuation. Professor Quaife contributes a short biographical sketch of Polk and some brief and helpful notes, which might have been multiplied and extended to advantage. The one adverse criticism upon the editor's work relates to the index, which is far from complete. Several excellent reproductions of portraits of Polk are given, and the press work is all that could be desired.

HERMAN V. AMES.

*University of Pennsylvania*

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**Rowntree, B. S.** *Land and Labour: Lessons from Belgium.* Pp. xx, 633. Price, \$3.50. New York: Macmillan Company, 1910.

Mr. Rowntree was led by his study of poverty in England to investigate the connection between social conditions and the system of land tenure in various European countries. But as this task soon proved too vast, he limited himself to the single country of Belgium, and the present volume is the result. The study is, therefore, a sociological, quite as much as a purely industrial or agricultural one; for the questions ever present in the mind of the author were apparently "why did this come to be?" and "how can it be remedied?" The volume is divided into six parts, of which the first deals with the social and economic conditions of Belgium; the second considers the industrial life; the third the agricultural; the fourth the factors of education, transportation, and taxation; the fifth, which is the longest, discusses the standard of life, including such problems as co-operation, intemperance, housing, pauperism, unemployment, etc. The last part presents the author's conclusions.

A mere summary of the contents cannot give a fair idea of the comprehensive scope of the work or of the labor involved in its preparation. The author states that it is the result of "four years' close study." There were no census reports from which data could be secured, and in some cases, especially in the investigation of land ownership, mortgages, etc.,



special investigations had to be made, involving enormous labor and large expenditures. In these investigations, however, the Belgium government gave its assistance, or lent its authority, and the result is almost equivalent to a census report on agricultural conditions. It is along these lines that the volume is at once most interesting and most valuable.

Belgium is densely populated and supports a large industrial as well as agricultural population. The land is subdivided into numerous small holdings, at least one in ten persons owning some land, and forty-seven per cent of the soil being held by persons whose holdings do not exceed 100 acres each. The average size of the farm in Belgium is 14.5 acres as compared with 146.6 acres in the United States. So great is the land hunger among the peasantry, however, that the farms are often too small for the most economical working, and the parcels are widely scattered. One chart, compiled by the author, shows a farm of twenty-eight acres split up into thirty-two different plots, the farthest of which were thirty-five minutes' walk from the farm house. As a result of this minute subdivision of the land, little machinery is used, rents are high, and cultivation is intensive and laborious.

As an industrial center Belgium shows extraordinary activity and produces a great variety of goods. But in industry as in agriculture, profitable production is purchased at the cost of low wages and long hours. The workers seem often underfed, the standard of living is low, illiteracy is common, the consumption of alcohol is large, and the disbursement of poor relief tends to pauperize the community. On the other hand, Belgium has valuable lessons, at least for England, in her policy of afforestation, in the construction of light, cheap railways, and in the aid given workingmen in the purchase of their homes. But much remains to be done to improve economic conditions and develop the industrial capabilities of the people. Among these remedial measures the author names factory legislation, compulsory education, restriction of the liquor traffic, and the reform of the system of poor relief. But a higher standard of life among the working people themselves is also necessary, and a better organization of their trade unions.

He would be a captious critic who would complain of this volume. In writing it Mr. Rowntree has performed a service which is possible for but few private investigators on account of the large expenditure of time and money involved. The work has been done in a most careful and painstaking fashion, and the results are thoroughly trustworthy and instructive. High praise must be accorded the volume as a whole. The impression is unavoidable, however, in reading the chapters on agricultural conditions, that they were written by a townsman rather than by an agriculturist, though this does not detract from their value as an economic study. Not merely may Englishmen derive profitable suggestions from the chapters on land tenure, forestry, railway building, etc., but Americans also should take to heart the lessons of Belgium's experience before Old-World conditions of land ownership and industrialism develop further in this country.

*University of Illinois.*

ERNEST L. BOGART.



**Seager, Henry R.** *Social Insurance: Program of Social Reform.* Pp. v, 175. Price, \$1.00. New York: Macmillan Company, 1910.

In this work Professor Seager has given to the public the Kennedy Lectures delivered by him in 1910 in the New York School of Philanthropy. To the reviewer this work commends itself from two points of view—as a contribution to the literature of workmen's compensation and insurance, and as a courageous advocacy of the general principle that certain of our more pressing social problems can be adequately met only by the state itself taking direct positive action. From the first viewpoint the book makes no pretense of being a work of original research or even one giving a full account of action which has been taken in this and other countries in the field to which it relates. Instead, it is an effort to bring before social workers the importance which the questions having to do with the insurance of the poorer classes occupy in the general program of social work, and the more significant features of the problems involved.

In successive chapters each of the contingencies, accidents, sickness, invalidity resulting from old age or other causes, and unemployment, which are responsible for the economic insurety of labor, is taken up for consideration. The value of this consideration lies, not in the bringing out of facts not previously readily accessible in other works, but in the fact that it gives us the clearly-expressed opinion of one of our leading economists regarding the many difficult questions of policy which this subject of workmen's insurance presents. On all these questions the author has let his audience know exactly where he stands.

As already stated, a second point of interest in this volume is the emphatic repudiation by the author of the principle of laissez-faire as regards the attitude that the state should occupy towards measures of social reform. "It is the purpose of these lectures," the author writes, "to insist that for the other sections of the country—the sections in which manufacturing and trade have become the dominant interests of the people, in which towns and cities have grown up, and in which the wage-earner is the typical American citizen—the simple creed of individualism is no longer adequate. For these sections we need, not freedom from governmental interference, but clear appreciation of the conditions which make for common welfare, as contrasted with individual success, and an aggressive program for governmental control and regulation to maintain these conditions."

Specifically the author denies that action taken by the state for the insurance of workmen tends to lessen the spirit of independence and self-help which is the most valuable possession of any people. On the contrary, he holds that by increasing the workman's sense of security he relieves him of the deadening effect of the feeling which the poorer classes have of the hopelessness of their efforts to improve their conditions. This is the old question which has divided economists and social workers for years, and which will probably continue to divide them for years to come. In this contest of opinion, however, victory is steadily inclining towards the side of those maintaining the beneficent effect of assistance from the out-

side, where experience has clearly shown that a class unaided cannot work out its own salvation.

W. F. WILLOUGHBY.

*Washington, D. C.*

Small, A. W. *The Meaning of Social Science*. Pp. vii, 309. Price, \$1.50. Chicago: University of Chicago Press, 1910.

In the ten lectures here included Professor Small is seeking to interpret to mature minds the present status and problems of social science. Unless one knows something of the field the volume will prove difficult reading. The more advanced student will find it both stimulating and suggestive.

"Knowledge of human experience cannot at best be many: in the degree in which it approaches reality it must be one knowledge." "The main function of the social sciences is to make out the meaning of human experience." This is the keynote to the first three chapters, "Unity of Social Science," "Disunity of the Social Sciences," "Sociological Reassertion of Unity." Here is emphasized the present lack of correlation and collaboration of the sciences—a necessary stage perchance which must yield however to a new conception of unity. There is an "universal reciprocity" between the parts of human experience—this involves interconnections—harmony no matter what becomes of any given study—say sociology.

"The Centre of Dissertation" (chapter IV) indicates that there must be some rallying point and this is the task of interpreting the actions of men. Here sociologists have often gone astray, and by setting up such abstractions as "society" have lost sight of the real man.

In chapter V—the Social Sciences as Terms in One Formula—the author asserts his conviction that the special studies are hardly justified unless the larger relations are kept constantly in mind. "How can we tell whether the emphasis in economic theory should be on production or on distribution until we decide in some provisional way at least, what the goal of economic progress should be?" is his pertinent question. The trouble frequently is that "social scientists are not interested in the fundamental logic of the relations which they profess to interpret."

In the lecture on The Descriptive Phase of Social Science, Professor Small gives the sociologist credit for insisting "that the aim of social science should be nothing less than coherent interpretation of human experience in the large." He suggests a scheme for a large research into some period of history and shows how the various groups might co-operate therein.

"Science is abortion until its function is complete in action." Hence in "The Analytical Phase of Social Science," the discovery of the different valuations of the human groups and their efforts to achieve these in daily life is indicated as the function of the student. This leads to "The Evaluating Phase of Social Science" when we can apply our estimates of moral values. The most reliable criterion would be the consensus of scientists representing the largest possible variety of human interests. Such evaluations will result in "The Constructive Phase." No fixed rule exists for the transfer from

the recognition of the need to the realization in action—yet this is the justification of the whole.

In the closing lecture, "The Future of Social Science," it is noted that "the case of *Men versus Men's Problems*, has taken a change of venue from the theological court to the sociological." In ever-increasing degree, social sciences recognize that improvement of human conditions is their goal. We are coming to social self-consciousness.

The statement is powerful in provoking thought. A valuable book for any student irrespective of the particular section of human action in which he is chiefly interested.

CARL KELSEY.

*University of Pennsylvania.*

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**Surface, G. T.** *The Story of Sugar.* Pp. xiii, 238. Price, \$1.00. New York: D. Appleton & Co., 1910.

*The Story of Sugar* is a popular treatise on the sugar industry. It contains sixteen chapters whose subject matter is briefly summarized in the following paragraph:

Chapters I-III, inclusive, are of an introductory nature. Chapter one describes the occurrence of sugar in nature, as in roots, fruits, stalks, trees, and honey; chapter II presents the important points in the history of the sugar industry from the earliest time to the present, and chapter III discusses various matters connected with sugar as a food. Chapters IV-VI are devoted to the cane-sugar industry, pointing out the controlling economic and geographical factors in production, and describing the present condition of the industry in the United States and other countries. Chapters VII-XI are devoted to beet sugar, and they form the most important part of the book. Again, they discuss the general factors controlling the industry and describe the conditions in the various countries. They point out particularly that during the nineteenth century gradual improvement took place in the tonnage of sugar beets raised per acre of land, in the percentage of sugar content in the beets, and in the completeness with which the sugar was extracted from the beets. Chapters XII-XVI take up miscellaneous matters connected with the sugar industry, including the production and use of syrups, candy, and by-products of sugar; a chapter on the marketing of sugar, with an account of the development of the sugar trust, and a very general chapter on the world's future sugar supply.

The author is an assistant professor of geography at Yale. He gives a simple, non-technical account of an industry concerning which there is a wide and perhaps inexcusable ignorance. His purpose was evidently to compress into a single readable volume as large a body of general information as possible, and he has succeeded very well. For scientific purposes, the work has very little value, and contains nothing new. As a special defect, no references are made to other works on the sugar industry, although several excellent works are in existence. The economist reading the book would like to know more about the influence of invention, labor conditions,

and legislation upon the progress of the industry; also more about the marketing of sugar and the factors controlling its prices. The book is encyclopaedic, and as such, serves a very important function.

JOHN BAUER.

*Cornell University.*

**Underwood, H. G.** *The Religions of Eastern Asia*. Pp. ix, 267. Price, \$1.50. New York: Macmillan Company, 1910.

A long familiarity with one of the lesser Oriental lands (Korea) is no charter to special competency for dealing with so vast and varied phenomena as the welter of far-eastern religions presents. It happens, therefore, that Dr. Underwood's book for the most part is based on secondary sources. Treating of Korea, he furnishes much interesting data especially on local worship and religious functionalities but his interpretive clue throughout is the dogma of a primitive monotheism based on "revelation" from which all heathen faiths have degenerated.

"The earliest worship of which we can find a secular record in the oldest countries was by every indication a monotheism, where with simplicity man worshiped his Creator only. Falling away from this came the deification of kings as the descendants or agents of this God; then came heroes, ancestors in general, powers of nature, resulting in pantheism, polytheism, fetichism; with an endless train of degrading superstitions" (p. 234). It is enough to say that except for this dogma no such interpretation would be suggested by many of the facts.

H. P. DOUGLASS.

*New York.*

**Wicksteed, P. H.** *The Common Sense of Political Economy*. Pp. xi, 702. Price, \$4.50. New York: Macmillan Company, 1910.

*The Common Sense of Political Economy* claims to be a "systematic exposition of the Marginal Theory of Economics." The claim is made good in the first book, which is devoted to minute and often exhausting analyses of the operations, psychological, physical and mechanical, which constitute all economic administration from the marketing by the housewife, to the organization of industry and the technique of foreign exchange. In Book II, which is described as "Excursive and Critical," the Marginal Concept is applied diagrammatically, with the result that certain very pertinent and destructive criticism is brought to bear on the so-called laws of diminishing and increasing returns, and on all illustrations of price as determined by the intersection of a rising curve of cost and a declining curve of utility.

In Book III, the Marginal Concept is applied concretely in the analyses of a "miscellaneous set of phenomena in the social and industrial world, both by way of exercise and by way of testing the principles." Some of the subjects chosen are gambling and speculation, the housing problem, unemployment, depression and crises, the immediate and permanent effects of

attempts to relieve distresses; changes in expenditure, such as would be involved in tariff changes; new forms of taxation, etc. Book I, therefore, is constructive; Book II is critical and destructive; Book III is practical and analytical.

By the application of the marginal principle, Wicksteed means that all economic problems are to be approached from the point of view of the scale of choices and desires of the human agent. "Every purchase," Wicksteed asserts in the introduction, "being a virtual selection, and involving choice between alternatives, is made in obedience to impulses and is guided by principles which are equally applicable to other acts of selection." To understand them we must study the "psychology of choice." In applying this principle to widely differing economic conditions, the reader is conscious of a new interest in many time-honored, even commonplace, facts. The book has many merits, and not the least of them is the new life it infuses into many hackneyed and well-worn themes. But one serious defect mars its usefulness as a text-book and its authority as a piece of research in the psychology of economic processes. The author does not take into account, nor make any mention, of other modern studies in the same field. He does not even make the reader aware that the central theme that price, "the terms on which alternatives are offered," as a problem in the psychology of choice, is a highly debatable proposition; or that since a similar theory of value was put forward by Ehrenfels in 1897, it has been the subject of the closest analysis, and of considerable controversy, with the result that the position has been abandoned in recent years by the majority of German and Austrian students.

MARION PARRIS.

*Bryn Mawr College.*



REPORT OF THE BOARD OF DIRECTORS OF THE AMERICAN  
ACADEMY OF POLITICAL AND SOCIAL SCIENCE FOR  
THE FISCAL YEAR ENDED DECEMBER 31, 1910.

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I. REVIEW OF THE ACADEMY'S ACTIVITIES.

The record of the Academy's activities during the year which has just elapsed must be a source of real satisfaction to our members. All the sessions have been well attended, and we have now reached a point at which those who have a message to deliver to the American people are anxious to avail themselves of the Academy for the delivery of such message. The influence of our publications has been strengthened, as is attested by the increasing use of such publications not only in our colleges and universities, but by many civic, commercial and other organizations.

The rapid growth of the Academy's work and influence again brings up a question which your board has emphasized at each successive annual business meeting; namely, the need of a separate building for the Academy, with adequate accommodations for the administrative and editorial work, for a library, and for a hall in which our monthly sessions, as well as the annual meetings, might be conducted. Your board is working on a plan to secure, on the occasion of the celebration of our twenty-fifth anniversary in 1914, a fund sufficient to carry out this purpose. Such a fund would, furthermore, enable the Academy to carry on a series of independent investigations, which would aid us greatly in increasing our contributions to social and economic questions, and would also strengthen the Academy's influence on the public opinion of the country.

II. PUBLICATIONS.

The system of publishing six special volumes each year has now become so firmly established that there is no further thought of departing therefrom. These volumes occupy the position of standard reference works on the subjects with which they deal, both in this country and abroad. They are constantly referred to in public discussions of economic and social problems. During the year 1910 the following special volumes appeared:

January—The New South.

March—Public Recreation Facilities.

May—Stocks and the Stock Market.

July—Administration of Justice in the United States

September—Settlement of Labor Disputes.

November—Banking Problems.

In addition, there were issued during 1910 the following supplements:

January—Development of Germany as a World Power.

March—Child-employing Industries.

May—Significance of the Woman Suffrage Movement.

July—Commercial Relations Between the United States and Japan.  
Significance of the Awakening of China.  
September—The Work of the National Consumers' League.

### III. MEETINGS.

During the past year the Academy has held the following meetings:

February 9—"The Significance of the Woman Suffrage Movement."  
April 8-9—Fourteenth Annual Meeting (five sessions)—"Administration of Justice in the United States."  
November 17—"The Meaning of Popular Government."  
December 8—"The Need for Currency Reform."

### IV. MEMBERSHIP.

The membership of the Academy on December 31, 1910, including subscribers, was 5,467. Of these, 1,122 are residents of Philadelphia; 4,036 are residents of the United States outside of Philadelphia, and 309 are foreign members. Compared with the membership on December 31, 1909, we find that in the Philadelphia membership there is a gain of 62; in the membership in the United States outside of Philadelphia, 358; or a total gain of 420. Seven members, Captain John B. White, Arthur E. Hepburn, Henry Kraemer, George R. Howe, David H. Miller, Samuel P. Avery and Baron M. Saito have been transferred to life membership.

During the year the Academy lost, through death, 76 of its members, five of whom were life members. The death of these members has deprived the Academy of some warm friends and enthusiastic workers.

### V. FINANCIAL CONDITION.

The receipts and expenditures of the Academy for the fiscal year just ended are clearly set forth in the Treasurer's report. The accounts were submitted to Messrs. E. P. Moxey & Co. for audit and a copy of their statement is herewith appended.

In order to lighten the burden of expense incident to the annual meeting, a special fund, amounting to \$1,510 was raised. The board takes this opportunity to express its gratitude to the contributors to this fund.

### VI. CONCLUSION.

In conclusion, your board desires to make a plea for a more active co-operation of the members of the Academy in the furtherance of the purpose for which the Academy was founded. We have but begun to utilize the Academy's opportunities, and our future growth will depend, to a very large extent, upon the interest and enthusiasm shown by our members.

The Treasurer's report is appended:

SUMMARY OF INCOME AND EXPENDITURES FOR THE YEAR ENDED  
DECEMBER 31, 1910.

Cash on hand January 1, 1910 ..... \$7,745.38

*Income.*

Annual membership fees .....	\$22,610.16	
Life memberships .....	709.64	
Special contributions .....	1,510.00	
Subscription to publications and sales thereof .....	8,274.70	
Income from investments .....	2,361.91	
Income from bonds matured .....	4,500.00	
Interest on deposits .....	139.02	
	<hr/>	40,105.43
		<hr/>
		\$47,850.81

*Expenditures.*

Clerical services .....	\$6,008.18	
Printing, stationery and postage in connection with publication of ANNALS and with general correspondence ..	19,269.82	
Office expenses .....	2,851.01	
Expenses of meetings .....	2,243.74	
Profit and loss .....	5.00	
Investments purchased .....	\$12,975.00	
Interest, premiums and commissions on above purchases .....	266.56	
	<hr/>	\$13,241.56
		<hr/>
		43,619.31

Balance, December 31, 1910 ..... \$4,231.50

Distributed as follows:

Mortgage Trust Company of Pennsylvania .....	\$3,807.50
Centennial National Bank .....	200.00
With A. S. Harvey .....	134.65
With E. Tornquist .....	100.00

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\$4,242.15

Less overdraft Academy office ..... 10.65

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\$4,231.50



## SPECIAL VOLUMES

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The United States and Latin America  
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Foreign Policy of the United States—Political and Commercial  
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Federal Regulation of Industry  
Administration of Justice in the United States  
Corporations and Public Welfare  
Tariff Problems—American and British  
Tariffs, Reciprocity and Foreign Trade  
Tariff Revision  
Railway and Traffic Problems  
Electric Railway Transportation  
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The New South  
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## MONOGRAPHS

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History of Political Economy. By GUSTAV COHN, translated by J. A. Hill. Pp. 142. Paper, \$1.00.  
Inland Waterways: Their Relation to Transportation. By EMORY R. JOHNSON. Pp. 164. Paper, \$1.00.  
Theory of Sociology. By FRANKLIN H. GIDDINGS. Pp. 80. Paper, 50 cents.  
Selected Official Documents of the South African Republic and Great Britain. Edited by H. WILLIAMS and F. C. HICKS. Pp. 72. Paper, 75 cents.  
Massachusetts Labor Legislation. By SARAH S. WHITTELSEY. Pp. 157. Paper, \$1.00.  
Housing Conditions in Jersey City. By MARY B. SAYLES. Pp. 72. Paper, 75 cents.  
The Pan-American Conferences and their Significance. Pp. 22. Price, 50 cents.  
Child Labor Legislation, Vols. I and II. Compiled by JOSEPHINE C. GOLDMARK. Pp. 64 and 68. Paper, 50 cents each.  
Child Labor and Social Progress. Pp. 177. Paper, \$1.00.  
The Consumer's Control of Production. Pp. 83. Paper, 75 cents.  
The Work of the National Consumers' League. Pp. 75. Paper, 75 cents.  
The Child Workers of the Nation. Pp. 244. Paper, \$1.00. Cloth, \$1.50.  
Child Employing Industries. Pp. 274. Paper, \$1.00. Cloth, \$1.50.  
Our State Constitutions. By JAMES Q. DEALEY. Pp. 98. Paper, 75 cents.  
Impersonal Taxation. By CHARLES H. SWAN. Pp. 149. Paper, \$1.00.

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WEST PHILADELPHIA STATION, PHILADELPHIA, PA.

